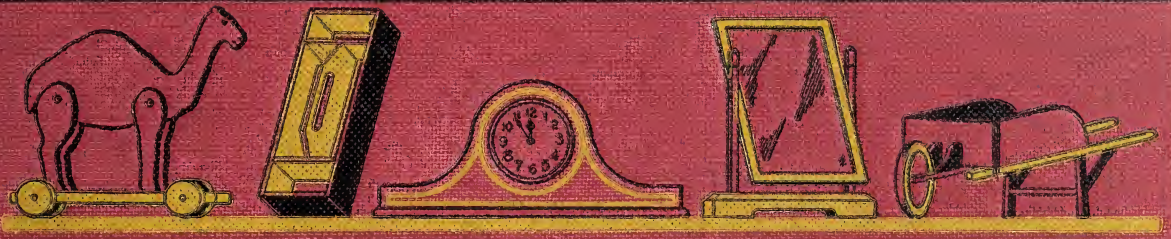

HAND CRAFT PROJECTS

SOLAR

BOOK 3

HAND CRAFT PROJECTS

Hand Craft Projects

FOR SCHOOL AND HOME SHOPS

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Drawings by the Author and A. M. Cornwell

Book 3

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PREFACE

This book, the third in the Hand Craft Projects series, is a continuation of projects given in Books 1 and 2.

Book 1, in addition to the beginning of the series of projects, contains 28 pages of useful information. This information deals with methods of squaring up stock, adjusting the plane, etc., as well as directions and illustrations that should be studied by the amateur before attempting to make these woodworking projects.

This series does not include directions for the use of common woodworking tools, because so many books devoted exclusively to the care and manipulation of tools can be obtained at any library, from publishers, or from the manufacturers of good tools.

Beginners and those who are unable, or do not have the time, to design or make drawings for toys or useful articles which they wish to make for themselves and friends, will find the Hand Craft Projects books very interesting and useful.

Teachers, boy-club leaders, and parents will find this series of projects a welcome addition, or substitute, to complete or vary their own established list of projects.

Hand Craft Projects series is being published in a number of volumes, and by adding one of the books of the series from time to time, it is hoped that a complete Hand Craft library will be established.

"By nature man likes to produce," says Roger W. Babson. "Give a boy a knife — you do not have to show him how to use it. He instinctively begins to make a bow or an arrow or perhaps something he has never seen. Why? Because in his soul there is an inborn joy in production. The salvation of our industries depends on discovering of something which will revive in man that desire to produce and that joy in production which he instinctively had when he was a small boy."

TABLE OF CONTENTS

PROJECT	PAGE	PROJECT	PAGE
The Home Workshop	9	Clothespin Blacksmiths	48
Slingshot Glider	14	Sidewalk Coaster	50
How to Cane a Seat	16	Crochet-Ball Holder	52
Fireside Bench	18	Dancing Jim	54
Skate Sail	20	Teddy-Bear Blacksmiths	56
Washington and the Cherry Tree	22	Book Trough	58
Footmobile	24	Picture Frame	60
Nail Box	26	Post Box	62
Homemade Drill Equipment	28	Christmas-Tree Stand	64
Kiddie Knitter	30	Toothpick Toys for Girls and Boys	66
Kicking Donkey	32	Tool Case	68
Tin-Lined Fern Box	34	Christmas Decoration	70
Telephone Pad and Grocery List	36	Shoe-Polishing Stand	72
Candle Holder and Bank	38	Paint Remover	74
Bird Houses	40	Bicycle Flag Holder	76
Marble Game	42	Window Cold Box	78
String Winder	44	Jumping Jack	80
Yarn Reel	46	Auto Truck	82

PROJECT	PAGE
Sewing Cabinet	84
Wood Pincers	86
Pencil Box	88
Motor Truck	90
Window Screen	92
Watch Holder	94
Sail Boat	96
Doll House — Plate 1	98
Doll House — Plate 2	100
Lemonade Stand	102
Hand Sled and Child's Seat Attachment	104
Ash Sifter	106
Toy Lion	108
Handy Play Table or Workbench	110
Toy Camel	112
Window Ventilator	114
Auto Creeper	116
Bingo Stick and Pinwheel	118
Trek Cart	120
Double Windmill	122
Holder for Salt and Pepper Shakers	124
Paint or Shellac Can	126
Clock Case	128
Wheelbarrow	130
Toothpick Toys for Girls and Boys	132
Dutch Windmill	134
Towel Holder	136
Balance Scale	138
Lap Board	140
Kites	142
Cigar-Box Wagon	144
Doll Swing	146
Bird Bath and Feeder	148
Dove Cote	150
Airplane	152
Clothes Hamper	154
Fireless Cooker	156

HAND CRAFT PROJECTS

THE HOME WORKSHOP

A home workshop fitted with tools and a simple machine or two may be made the source of much fun and useful enjoyment for the bright boy and the industrious man. Such a shop may occupy space which otherwise would be wasted in the basement, in the attic, or in an unused room. Even in flats and apartments a "shop corner" consisting of a compact worktable and a tool case can be accommodated in a rear sun room, on an inclosed porch, or in the kitchen.

In years gone by, the average boy had to do many tasks and chores about the house, which are now no longer necessary. Some of these tasks were extremely unpleasant and tiresome, so that the boy did not begin to understand until later in life how valuable they were and how much they helped him to become a real man. The boy of today seldom needs to do back-breaking jobs in the barn or woodshed. He has, however, just as many opportunities as the boy of earlier days to make and repair useful conveniences for the home, to plan and make toys, and to work out amusement novelties. In the home shop, the many interesting things which are shown or talked about in the manual-training shop in school can be worked out leisurely and to suit the boy's own likes. Many boys and men use the home shop to build radios, to make furniture, to turn lamps, candlesticks, baseball bats, and fishing rods; to construct model airplanes and ship models; to hammer and fashion copper and pewter trays and plates; to make jewelry and metal novelties; to finish furniture and paint toys; to tinker and repair electrical devices; and to do other numerous and interesting jobs.

The home workshop will be harmful to boy and man if it is not healthful. The light must be sufficient so that the boy does not strain his eyes whether he works in the daytime or at night. The room must be ventilated so that there is always plenty of fresh air without harmful drafts. Good work is not possible unless the worker is comfortably warm during cold weather and reasonably cool in warm weather. It is essential to have enough windows for light and air, as well as correctly placed electric lights for night use.

The equipment of the home shop will depend upon the age of the boy or man who is using it and upon the kind of work which he wants to carry on. A good workbench and a limited number of good hand tools are better as a rule than an elaborate outfit. In the first two books of this series, lists of tools, equipment and materials, and plans for benches for the home shop may be had. It may be worth while to repeat a useful list of small tools that every home shop requires:

Woodworking

1 Jack plane, 14″
1 6″ Try square
1 Crosscut saw, 20″ — 10 point
1 Ripsaw, 20″ — 8 point
1 Steel rule, 12″
1 Carpenter's square
1 Wood rasp
1 Oilstone
1 1″ Auger bit
1 ¾″ Auger bit
1 ½″ Auger bit
1 ⅜″ Auger bit
1 ¼″ Auger bit
1 Rose countersink
1 1″ Chisel
1 ½″ Chisel
1 ⅜″ Chisel
1 Combination backsaw, rip, and crosscut
1 Turning saw
1 Nail set
1 Pencil compass
1 Hammer, Maydole 13
1 Spokeshave
1 Jackknife
1 ¼″ Chisel
1 Marking gauge
1 3/16″ Twist drill
1 Ratchet bit brace
1 Rectangular scraper
1 Bit file
1 Screw driver
1 Pair pliers
1 Screw-driver bit
1 3-sided saw file

Tinning

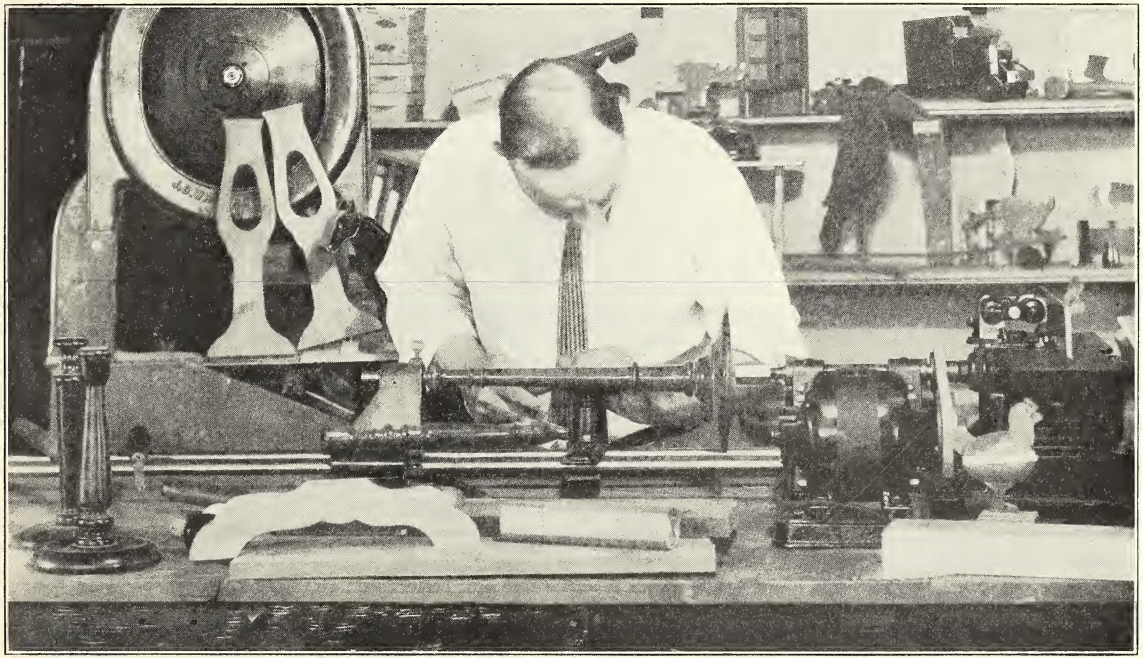
Soldering scraper
Soldering copper
Snips
Bar solder
Sal ammoniac
Muriatic acid and zinc
Blowtorch

Painting

Paint and varnish brushes as needed
Putty knife
Glass cutter

The common use of electricity in the city and in the

A Scroll Saw May Be Operated by Power or By Hand with Safety

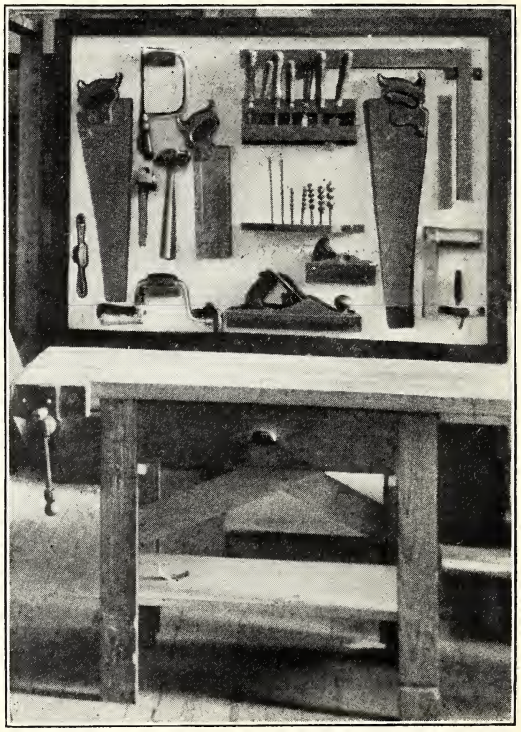


Combination Woodworking Machines Occupy Little Space and Can Be used for a Great Variety of Work

country has done more than any other agency to interest boys and men to equip and use the home shop. During the past five years numerous home-shop machines have been devised and marketed, which enable the home mechanic to work wood and metals in a great variety of ways. All these machines can be operated from a light socket, and many of them are so ingenious and compact that they may very well be considered universal machines. The common use of electricity and gas also makes it possible for the home craftsman to operate a Bunsen burner or even a small heat-treating furnace so that work with various metals is very easily done in the home shop.

A few select books are especially useful in the home shop. It is difficult for any boy or man to remember more than a limited number of the processes for making various special problems and projects. A book or two on each, woodworking, art-metal work, sheet-metal work, wood finishing, and an encyclopedia of formulas are extremely helpful for the inexperienced home craftsman.

The problem of purchasing materials for use in the home shop is always an interesting one. In the large cities there are lumber dealers, metal dealers, and other supply houses that can provide materials and fittings for practically any job which the home craftsman may care to undertake. A junk dealer frequently has useful parts and materials, and the boy who has a bargaining turn of mind can frequently obtain lumber, metal fittings, etc., at a trifling cost, for turning out any article or toy which he may desire to construct.



Homemade Workbench and Tool Panel for the Home Workshop

The household itself frequently has waste material that can be employed in a home shop. The United States Department of Commerce has frequently called attention to the enormous waste caused by the destruction of wooden packing cases. This lumber can be used for making many useful and interesting articles. Many of the projects suggested in this book are designed to be made of box lumber. The new methods of finishing wood which are in vogue at the present time make it readily possible to take any common box wood and give it the appearance of a high-grade piece of furniture.

The boy or man who develops one or more hobbies in a home workshop during his spare hours is contributing something to his own development as a man and citizen, and is helping to maintain the stability of that all-essential institution, the American Home. In doing this, he is contributing to community and national welfare as well.

SLINGSHOT GLIDER

At the present time, boys are giving a great deal of attention to the making of model airplanes; therefore, anything pertaining to that field should prove very interesting. This slingshot glider is sure to strike the fancy of almost any boy, and in making it, he can vary the construction to incorporate any of his own ideas.

Material

As light weight a wood as you can obtain; rubber bands, wire, and tacks will be needed.

Construction

1. First make part A. This piece tapers both in width and in length. Cut the slot very carefully with a thin backsaw. Careless work will result in splitting the piece.

2. With a pair of shears, cut the wings and part C from light-weight cardboard like that used in a shoe box.

3. The wooden wedge B is rather small and may cause a little annoyance.

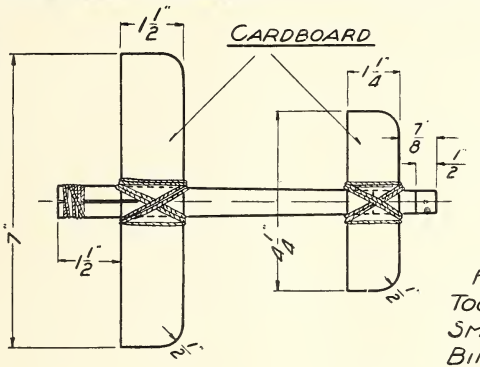
4. Assemble all parts with brads; then wind with ordinary string, as shown in the drawing.

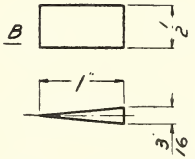
5. Make the sling next. The one shown is made of wire, heavy enough to stand the strain of casting the glider. However, the old-fashioned kind may be used if the proper piece can be obtained from a tree. Form the wire to the shape shown, and attach a strong rubber band.

6. The small wedge may seem useless until you try to launch the glider without it. Its purpose is to elevate the front wing so it will rise.

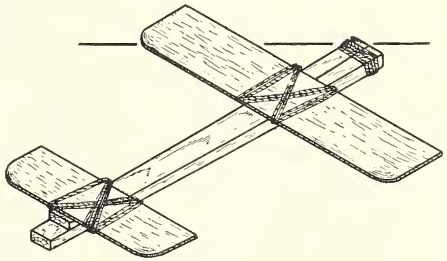
7. No finish is necessary, and the directions for operating the toy are given in the drawing.

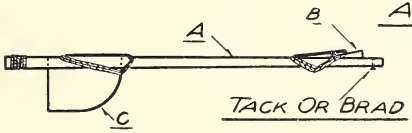
SLINGSHOT GLIDER.

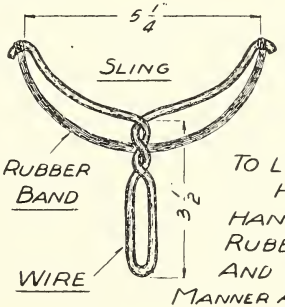


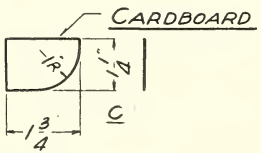


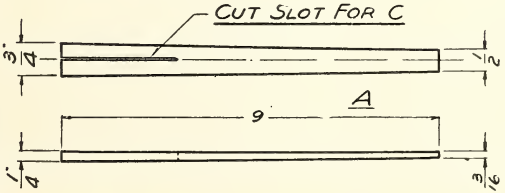
FASTEN PARTS TOGETHER WITH SMALL BRADS, AND BIND WITH STRING AS SHOWN











TO LAUNCH GLIDER - HOLD SLING IN RIGHT HAND, GLIDER IN LEFT HOOK RUBBER BAND OVER TACK AND RELEASE IN SAME MANNER AS IN SAILING A DART

HOW TO CANE A SEAT

Knowledge of furniture caning may be put to several good uses. In the first place, it may be used in repairing chairs around the house, in making caned seats for new pieces of furniture, or it may be used to bring in a little income. In the cities at present, it is very difficult to find anyone who will do an odd job of caning. A live boy with a little initiative, therefore, can easily build up a little business in this work, if he so desires.

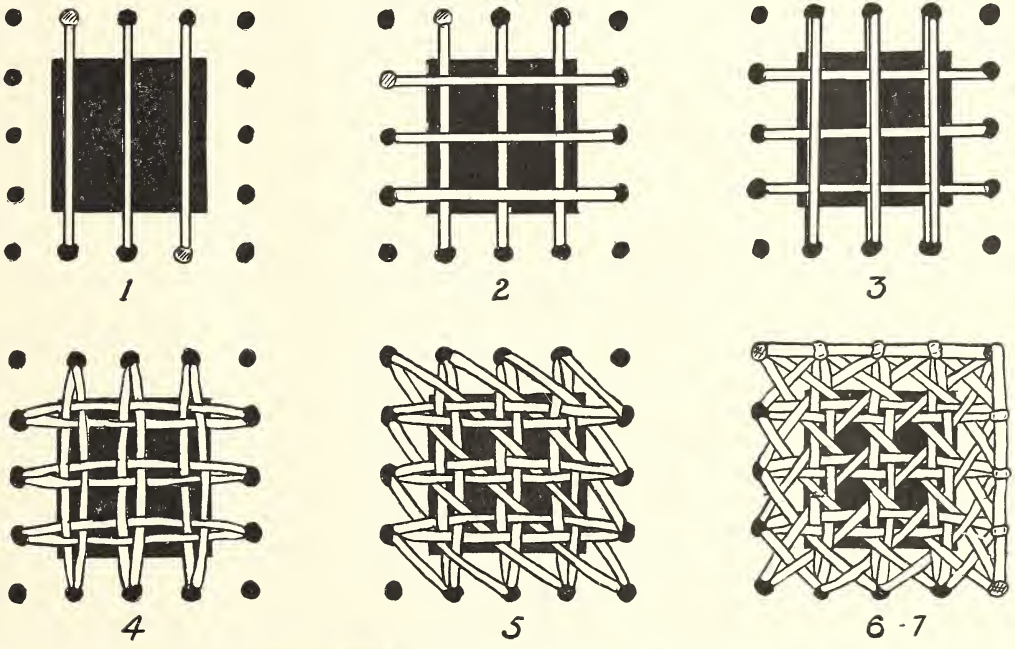
Cane usually comes in hanks of 500 to 1,000 ft. in length. Commercially it is known as "rattan" and is the outer bark taken from palms which grow in China, India, and other Oriental tropical countries. For general work two kinds of cane are necessary; one for covering the seat, and one for finishing the outer edge and covering the holes. Rattan dries out rapidly, which makes it necessary to soak it in water to make it pliable. Before beginning work, several strands are separated, wound about the hand, tied, and placed in a pail of water, one at a time. The soaking destroys the gloss of the cane, but this can be restored by shellacking the finished work.

For hand-caning, holes are required. They should be spaced off on the seat frame, beginning at the center of each of the front, back, and side pieces, working toward the corners. Make ¼-in. holes, ½ in. from the inner edge of the frame, and ⅝ or ¾ in. apart.

Pegs about 2 in. long, whittled a trifle smaller than the holes, are required to hold the cane from slipping back through the holes while the work is under way. Begin work by pegging one end of the cane in the middle hole at the back of the seat, as in Figure 1, and then running it across the top of the seat to the middle hole in the front, down through this hole, up through the next hole to the right, back across the top of the chair, and down through the opposite hole at the back. Continue caning until the half of the seat on the right side of the middle holes is completed. Then cane the left side, using the pegs to hold the cane tight in one hole while pulling the weaver through the next. When joining the weavers, cut them so they will tie under the frame.

After one layer has been run across the seat, proceed as in Figure 2, in which the second layer is run at right angles across the first. In Figure 3, the third layer runs directly over the first. In Figure 4, the weaver runs over one, under one, etc. In Figure 5, the weaver runs cornerwise, and in Figure 6, it runs cornerwise in the opposite direction. In Figure 7, the binder covers the holes on two sides. It is fastened by a weaver run up through a hole, over the binding, and down through the same hole, over and up through the next hole, and so on, fastening the two ends of the binder at one corner by putting the cane over the top of a short peg and driving both cane and peg into the hole.

How To Cane A Chair Seat



FIRESIDE BENCH

Benches of this kind are very popular in the home, and this one is particularly so because it is slightly different from most of them in that the top is caned like a chair seat. Not much material is required, and the operations are comparatively simple.

Material

Wood, such as oak, gum, walnut, etc., should be selected to match the rest of the furniture. Dowel stock, screws, and glue will also be needed.

Construction

1. Two designs are shown for the legs. Design B is somewhat more difficult to make than design A, but it also is more attractive. First, both designs must be brought to definite over-all dimensions.

2. If design B is to be used, lay out the outline carefully with a sharp pencil. Place two legs in the vise, and bore a ⅜-in. hole, ⅛ in. deep. Reverse the legs, and bore another hole in like manner from the other side. The purpose of these holes is to start the shape of the modeling. If the holes could be bored halfway through from each side accurately, that would be the best way, but that plan has not been found satisfactory.

3. After modeling as directed above, remove the rest of the material with a coping saw, chisel, rat-tail and half-round wood files. Finish with coarse and fine sandpaper.

4. Next, make the end and side rails, being very careful to get the ends of the pieces perfectly square to insure good joints. Lay out the location of the dowel holes on the ends with a marking gauge.

5. Make the spreaders, and lay out the location of the dowel holes as was done for the pieces previously mentioned.

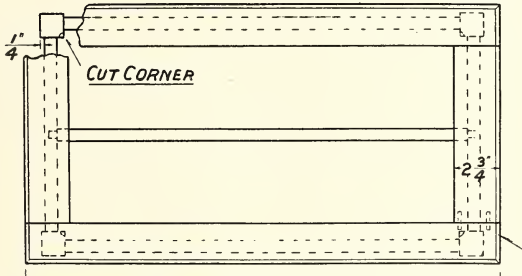
6. The top frame, which is to be caned, is fastened in the same manner as the other pieces; that is, with dowels. It is held to the bench proper with flat-head screws, as shown in the front-view drawing. Before fastening the frame in place, remember to cut the leg corners slightly to allow the cane to pass through easily.

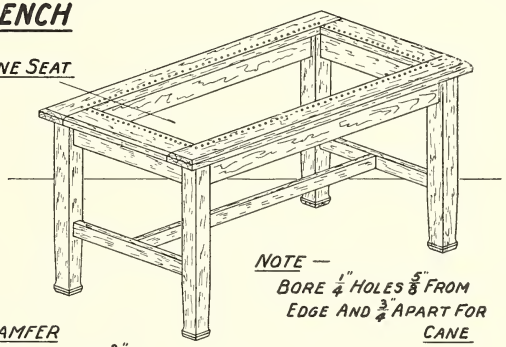
7. The piece is assembled in the same manner as any other piece of its kind. Test the joints to see that they fit well, remembering that, if the dowels are too long, the pieces will not fit together well. When satisfied as to the fit, apply glue to the dowels, put them in place, and clamp together until dry. This operation must be done in pairs.

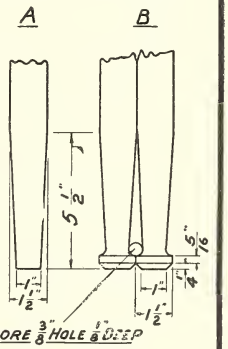
8. Do the caning in the usual manner. Make this a good job, remembering that careful work is necessary.

9. Finish by staining to suit, being sure that all pieces are well sanded. The piece may be waxed, or it may be given two coats of thin shellac.

FIRE SIDE BENCH







SKATE SAIL

This skate sail was originally intended for use on ice, but there is no reason why it should not be used to propel a roller skater. The only objection to such use is that the wind is not always in the right direction, and it is difficult to tack back and forth on the narrow pavement.

Material

1. Use unbleached cotton cloth for the sail. It may be purchased 84 in. wide and, if cut according to the diagram shown in the drawing, one piece will make two sails. One of the sails, of course, must be sewed together down the center. Heavy thread will be needed for stitching.

2. For fastening the sail to the frame, use liftadot automobile curtain fasteners, which may be purchased at any automobile accessory store.

3. For the frame, light-weight wood, such as bass-, box-, or cottonwood should be used.

Construction

1. *The Sail*

a) Lay out the sail according to the dimensions in the drawing, and sew it with heavy thread on a sewing machine. Reënforce all corners.

b) Clinch the eyelets in the hem of the sail. Then, with a sharp knife, cut the cloth out of the center of the eyelet.

2. *The Frame*

a) Get the two pieces of wood to the dimensions shown, planing them smooth and rounding the corners.

b) Two strips of metal, two angle irons, and ½-in. rod are used to join the parts of the frame. Bore a hole for the rod in the end of the 9-ft. piece. The size of the hole should be just enough smaller than the rod, so that the latter will have to be driven lightly in place.

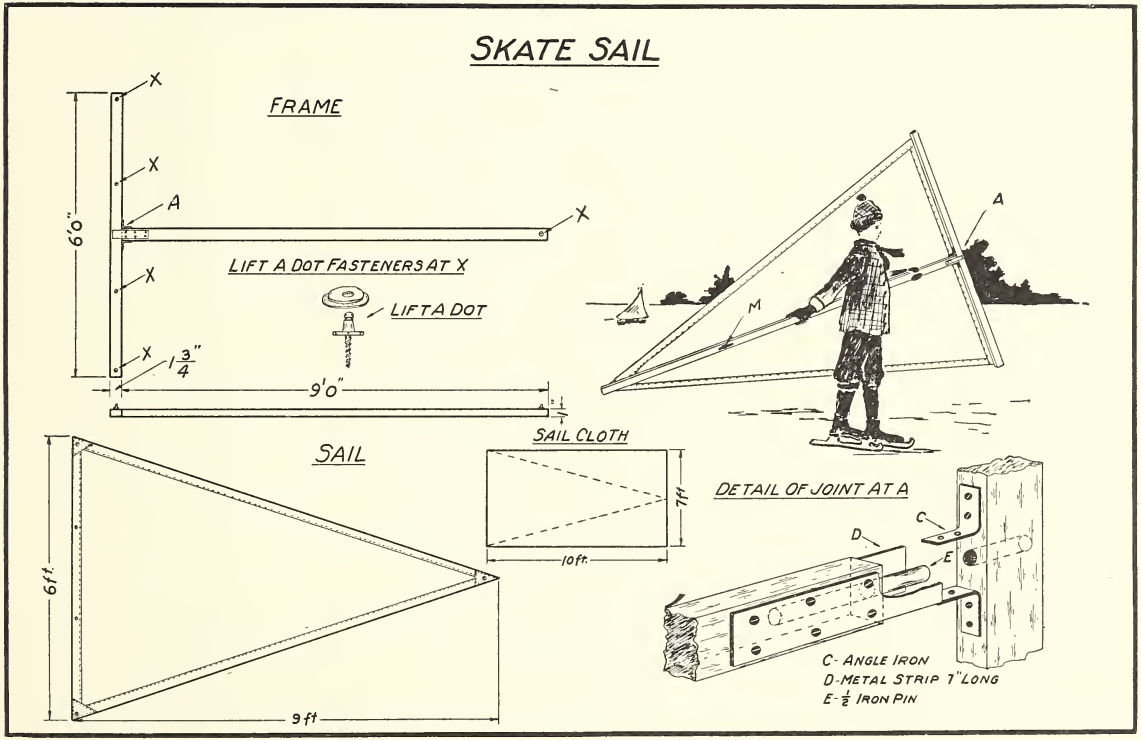
c) Bore a hole through the 6-ft. piece to receive the rod. This hole should be enlarged slightly so the rod will slip in and out easily.

d) The angle irons may be purchased at any hardware store, but the metal strips will have to be purchased and taken to a blacksmith shop to have the holes drilled and countersunk, provided you have no tools with which to do the work yourself.

e) Locate the positions of the fasteners for the sail, drill holes for them, and turn the fasteners into place with a small wrench.

f) The method of assembling the frame is clearly shown in the detail drawing of the joint A. This construction, together with the method of fastening, makes it possible to take the frame apart and roll it with the sail into a small bundle for carrying.

SKATE SAIL


FRAME
X
X
A
X
X
X
6'0"
LIFT A DOT FASTENERS AT X
LIFT A DOT
1 3/4"
9'0"
A
M
SAIL
6ft.
9ft
SAIL CLOTH
7ft
10ft.
DETAIL OF JOINT AT A
C
D
E
C- ANGLE IRON
D-METAL STRIP 7" LONG
E-½ IRON PIN

WASHINGTON AND THE CHERRY TREE

This is one of the most interesting "workable" toys that can be constructed. Any boy will take keen delight in making one for himself, his little brother or sister, or for a little friend.

Material

Use any wood of good quality, soft wood preferred.

Construction

1. First make patterns of those parts for which patterns are needed. If several toys are to be made, lay the patterns out on stiff paper or cardboard. If only one toy is to be made, the work may be laid out directly on the wood. Proceed by laying out a series of ½-in. squares, through which the outlines of the figures are traced, as shown in the drawing. If patterns are used, cut them very carefully to shape, then place them on the wood and trace accurately. Cut exactly to the lines with a coping saw.

2. The top, sides, and front bolster of the float require no special directions.

3. The front wheels should be made with great care. Lay them out with a pair of sharp, steel dividers, scribing deeply. This will make a line very easy to work to.

4. The back wheels require considerable care as the wheels and axle preferably are of one piece, although the wheels may be made separately, with the axle glued in place if necessary. If made of one piece, the best results will be obtained by turning them to shape on a turning lathe.

5. The back bolster is made of two pieces. In boring the hole, fasten the two pieces together, and locate the center of the hole to be drilled through it from both ends. With a bit, slightly larger than the diameter of the axle, drill halfway through the bolster from each end.

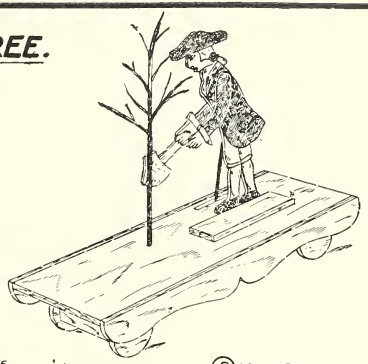
6. Assembling directions are found in the drawing. Bear in mind that all parts should work very freely. Place small washers between the wheels and the bolster and between the heads of the screws and the wheels.

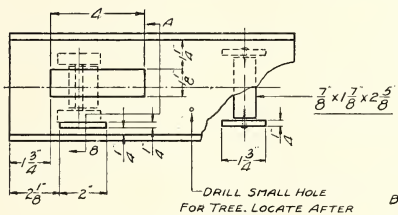
7. Cherries may be made for the tree by rolling small pieces of red candle between your fingers until they are soft and round. String the pellets on a thread, and fasten them to the branches of the tree. Leaves may be made of green paper.

Finish

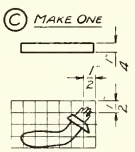
Painting directions are found in the drawing. Be sure that each coat of paint is dry before applying the next coat.

WASHINGTON AND THE CHERRY TREE.

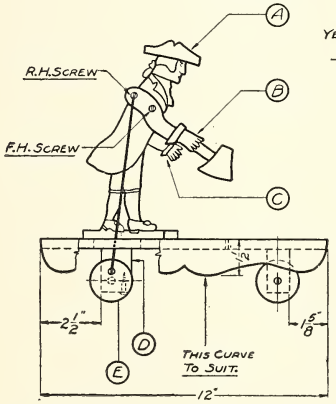




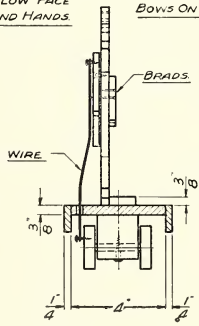
7/8 x 1 7/8 x 2 5/8

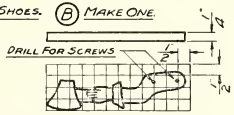


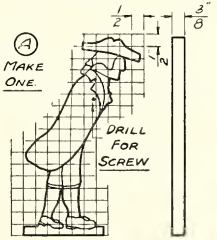
—PAINT—
BLACK - HAT, HAIR BOW, COAT AND SHOES.
RED - HATCHET, TROUSERS.
WHITE - HAIR, SHIRT, CUFF, STOCKINGS AND BOWS ON SHOES.

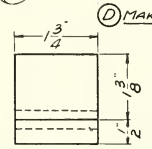


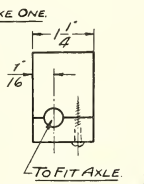
YELLOW FACE AND HANDS.

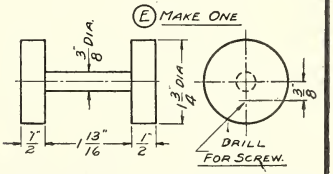












FOOTMOBILE

The footmobile, like roller skates, is very popular with boys, especially those having newspaper routes. It is more convenient than a cart for the boy with a small number of papers, because, with a bag slung over his back, he can cover his route in much less time.

Material

1. With the exception of part C and the bolts, the material used is good, straight-grained wood.

2. Part C is made of a piece of iron ⅛ in. thick. The bolts can be purchased for a few cents at any hardware store.

Construction

1. The cut-outs in part A, which receive the end of the bracket and the back wheel, can best be made by boring holes at the ends of the cut-out and then sawing to the holes with a ripsaw.

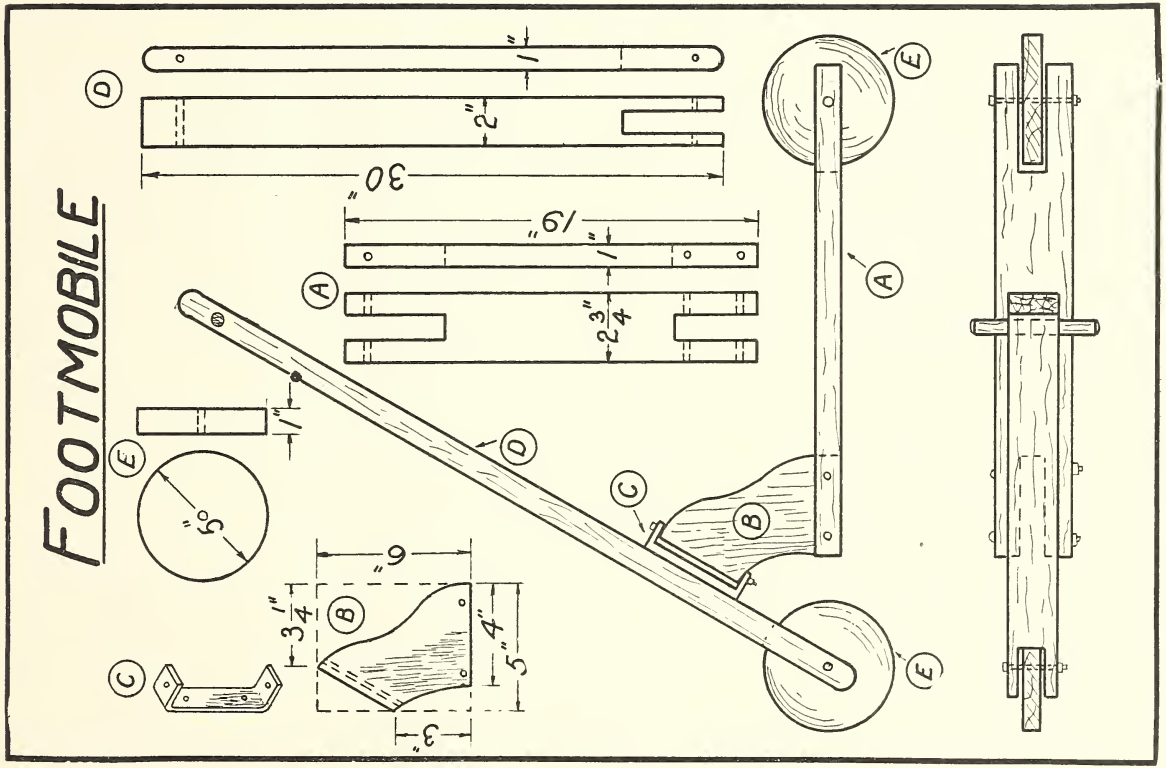
2. If a band saw is not available, cut part B to shape with a coping or a turning saw. Bore the holes in this piece very carefully. Fit the bracket, bolt it to the footboard A, then bend the metal part C to shape in a vise. Drill holes, and countersink for the stove bolts.

3. The dimension for the steering handle D may be varied to suit the boy's height. Cut a slot in the end of the handle for the front wheel, and fit a piece of dowel rod or broomstick near the other end for a hand hold. Fasten the handle to the metal piece with flat-head stove bolts.

4. Metal wheels should be used if they can be obtained, but, if not, they must be made of wood. Lay them out very accurately, and cut to shape with great care. In assembling the wheels, it will be well to use washers on each side to reduce friction. Do not forget to oil the footmobile after assembling.

Finish

Probably the best finish to give the footmobile is a good coat of paint. Different colors may be selected according to the ideas of the maker.


FOOTMOBILE
D
1"
2"
30"
A
19"
1"
2 3/4"
E
5"
1"
D
C
B
E
A
E
C
B
6"
1 3/4"
4"
5"
3"

NAIL BOX

Habits of neatness and orderliness should be learned very early by every boy. Those who work with tools should have a place where each tool should be kept when not in use. The box shown will be found very useful for nails, screws, etc. Boxes of any size may be made, with this one as a suggestion, to care for various materials. Your mother no doubt would be pleased to have something of the kind to use as a button box.

Material

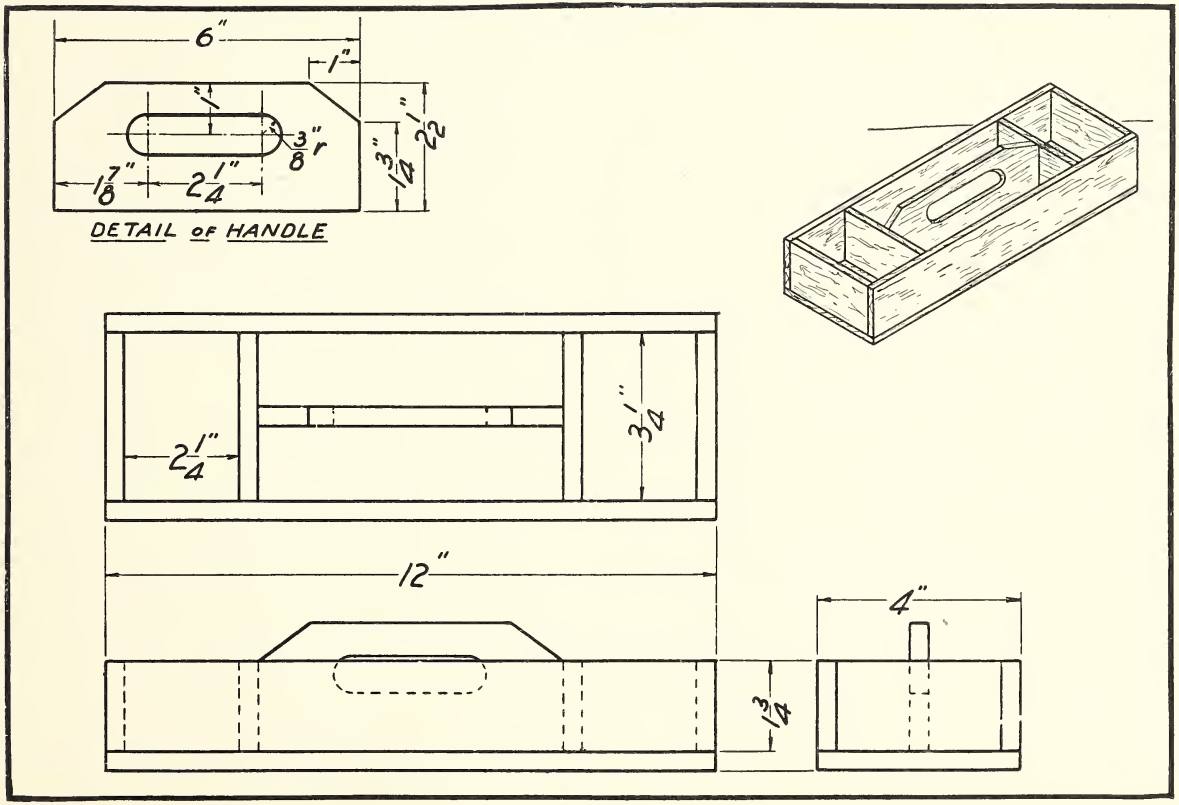
Wood and brads will be needed. Hard wood is difficult to nail, so it is best to choose a good grade of soft wood.

Construction

1. Get out all the pieces to the required dimensions.
2. It requires more work to make the handle than any other piece. It must, therefore, be laid out with care. The corners look simple because only straight lines are used; nevertheless, the work must be accurate if the handle is to look well in the finished box. Lay out the slot with a compass on the center line.
3. Cut the slot before cutting the corners. The ends of the slot are formed by boring holes with a ¾-in. auger bit. The stock being thin, it will be necessary to hold the piece in a vise, crosswise of the grain, while the boring is being done. Another necessary precaution is to bore from each side of the piece. Because of the thinness of the stock, it will not be necessary to lay out the centers on each side. Start boring from one side, and as soon as the point of the bit appears on the other side, reverse the operation. Connect the outside of the holes with straight lines, and remove the rest of the material.
4. Before assembling, sand the pieces well. Do not sandpaper across the grain. Always work with the grain.
5. Fasten the parts together with 1-in. brads and be sure they are driven straight. First nail the inner partitions to the handle, then place all three in position and nail from the outside of the box into the partitions.

Finish

If the box is to be used for nails, etc., no particular finish need be given, but if it is to be given to mother to use for buttons, etc., it should be stained and shellacked.


6"
1"
1/4"
3/8" r
1 7/8"
2 1/4"
1 3/4"
2 1/2"
DETAIL OF HANDLE
2 1/4"
3 1/4"
12"
4"
1 3/4"

HOMEMADE DRILL EQUIPMENT

Boys who are interested in drilling will find this gun and sword very convenient pieces of equipment to have, and not very difficult to make. Several boys could easily make quite a number of pieces in a short time.

Material

A broomstick and straight-grained wood is all that is necessary.

Construction

1. First, make the barrel from the broomstick. Remove a small section from one end to provide a flat surface for fitting to the gunstock, as shown in the drawing. Place a small round-head screw about 2 in. from the front end of the barrel to give the appearance of a sight. Since broomsticks usually are made of hard wood, it will be necessary to drill small holes for the screws used to fasten the barrel to the stock.

2. Next, make the gunstock. Lay it out and cut carefully to your lines. The drawing shows the edges sharp, but these should be nicely rounded with a knife, finishing with sandpaper. For a trigger, which is not shown, fit a short piece of dowel rod in place.

3. Assemble the parts with screws. Nails may be used, but screws hold better.

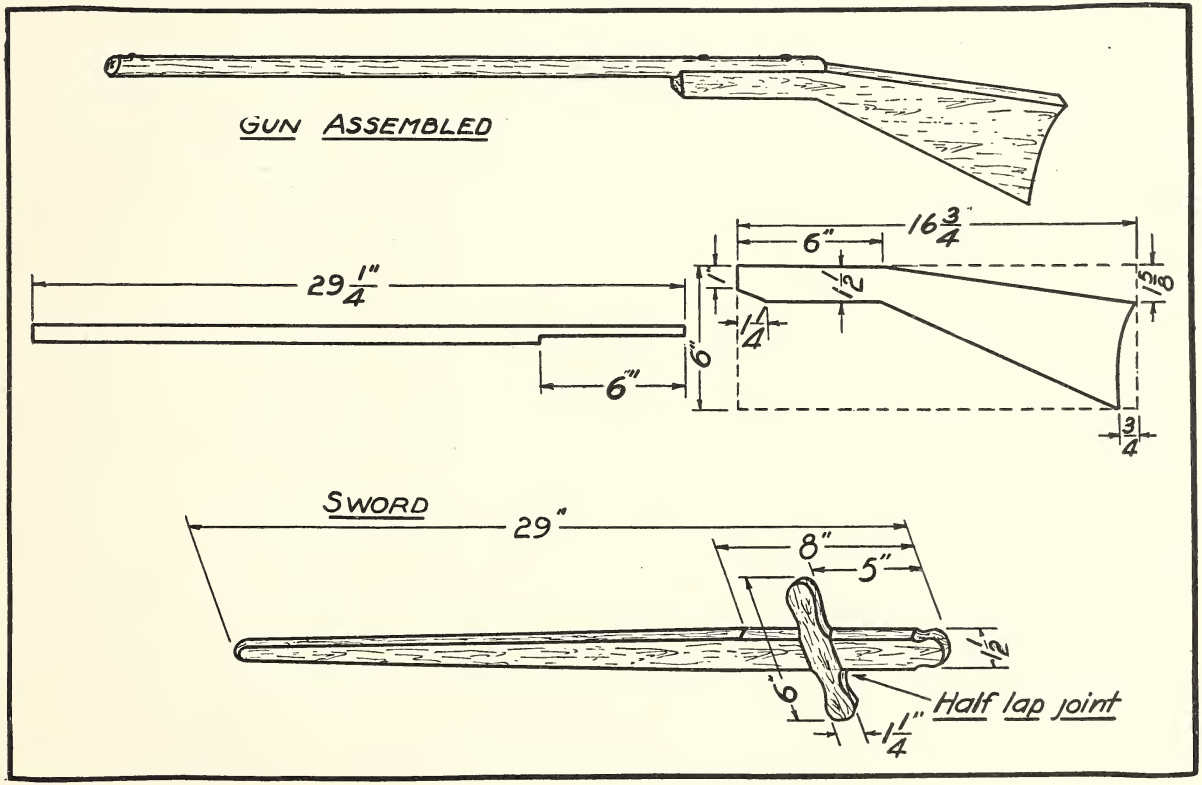
4. The sword is easy to make. Cut the stock to the first over-all dimensions, but before reducing to the final shape, lay out and cut the half-lap joint. This procedure is necessary in order to get straight working surfaces. No detail for the joint is given, but it is made by cutting notches halfway through each piece of a width equal to the part to fit into the notch. After making the joint, the other work may be completed.

5. An ordinary belt can be used to carry the sword, with a piece of wire fastened to it for a holster.

Finish

1. The gun may be finished by staining it brown or by painting it black. If a number of guns are made, all should be of the same color.

2. The sword will be very attractive if the blade is painted with aluminum paint and the handle and guard with bronze or gold.


GUN ASSEMBLED
29 1/4"
6"
6"
16 3/4"
6"
1"
1 1/2"
1 1/4"
1 3/8"
3/4
SWORD
29"
8"
5"
1 1/2"
6"
1 1/4"
Half lap joint

KIDDIE KNITTER

This knitting frame is not a new device, having been made many times before in handwork classes, but it has enough good points to warrant its being used again. To make and use the frame will be an interesting experience for many boys.

Material

Use soft wood of a good quality.

Construction

1. Plane the stock for the ends in one piece. This will insure both being the same height, which is necessary in order that the machine will lie flat on the table.

2. Prepare the top pieces, but, before fastening them to the ends, sandpaper all parts, then lay out the location of the brads over which the knitting is to be done. To do this, draw a line the length of each piece 5/16 in. from each edge.

3. Ordinary pins may be used, provided they are of good size, but ¾-in. No. 18 wire brads are much stronger. Drive them in place before the parts are assembled, as shown in the small detail at the lower left of the drawing.

4. Use 1-in. brads for assembling, being sure that the edges from which the brads were laid out are on the inside.

5. The knitting tool is made by driving a small darning needle into the end of a piece of round rod, then pulling the needle out and forcing the eye end into the hole thus made, leaving the sharp point projecting.

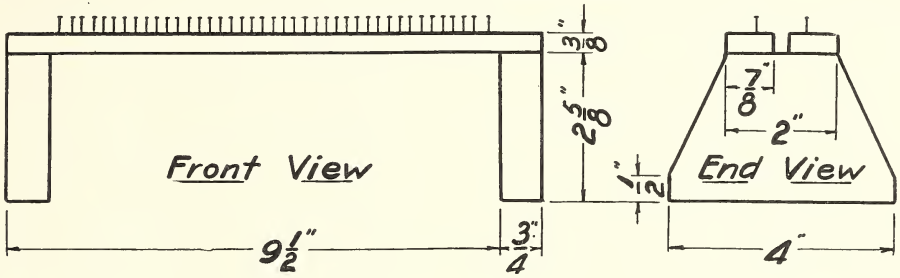
6. After the needle is in place, light a match, and hold the point of the needle in the flame until it gets red-hot; then, with a pair of pliers, bend the end slightly.

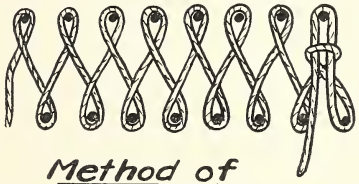
Finish

To keep the machine from soiling easily, it may be given a light coat of shellac.

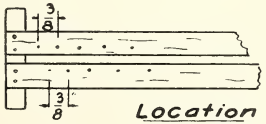
Use

To start the work, place the yarn on the brads as shown in the sketch. After placing the yarn across the machine once, lift the first loops with the tool up and over the back threading and over the brads, letting the loops fall into position between the rows of brads. Different patterns may be made by using different colored yarns. If small pieces are wanted, use only a part of the machine. If large pieces are desired, make the top pieces long enough to suit. When the piece is completed, to prevent raveling, pass the yarn through the last loops with the needle. The work then may be removed without fear of raveling.

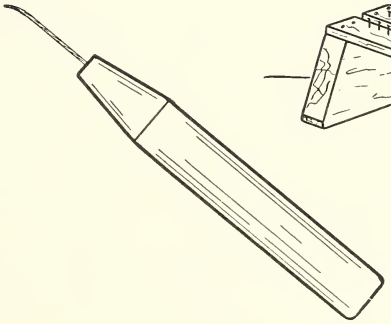




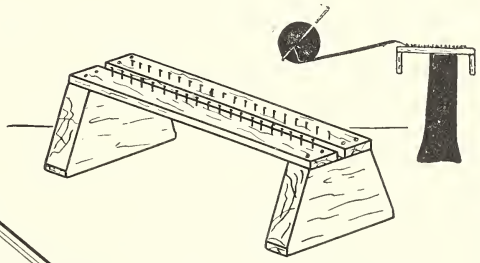
Method of putting yarn on pins.



Location of brads.



Knitting Tool



Parts Assembled

KICKING DONKEY

Material

A cigar box, pins, thread or string, and water colors or crayon are required.

Construction

1. Lay out the patterns on paper if it is desired to make more than one toy; otherwise the outlines may be made directly on the material from which they are to be made.

2. Use the bottom of the cigar box for this work. Select the best side and, with sandpaper, remove any dirt or rough spots. Lay out all the patterns, locating them so that the grain of the wood runs in the direction shown on the assembly in the lower right corner of the drawing. Cut out each part very carefully with a coping saw.

3. Locate all pin holes, mark with a pencil, then drill with a fine bradawl. To avoid splitting the thin wood in this operation, turn the awl while forcing it through.

4. Next, tie the end of a piece of thread in hole 4, and fasten pattern B to pattern A with a common pin placed through the holes made with the awl. The pin will project beyond the two parts about ¾ in. With a pair of round-nosed milliners' pliers, cut the pin so the projection will be but ⅜ in., then turn a loop on the end, thus fastening the parts together. Before closing the loop, slip one end of a small rubber band through it.

5. Fasten pattern D to pattern A in the same manner, first tying a piece of thread in hole 7, then connecting with a pin through hole 2.

6. Next connect pattern C to pattern A, first running a pin through hole 8 and fastening a rubber band in the loop made at the end of the pin. Run the ends of the the threads already tied in B and D through holes 5 and 6, but do not tie them. They must be adjusted to length and tied after C has been fastened by a pin run through hole 3. The length of the rubber band will determine the length of these threads as they are drawn just tight enough to hold the head, leg, and tail in a good position without stretching the rubber band.

7. Fasten the handle with four pins as shown. Connect a piece of thread to the head, and the toy is ready for trial. If successful, when the handle is held in one hand and the string is pulled with the other, the donkey will lower his head and kick up his leg and tail.

Finish

The toy may be made to look very natural if decorated with crayons or water colors. This is left to the individual taste.

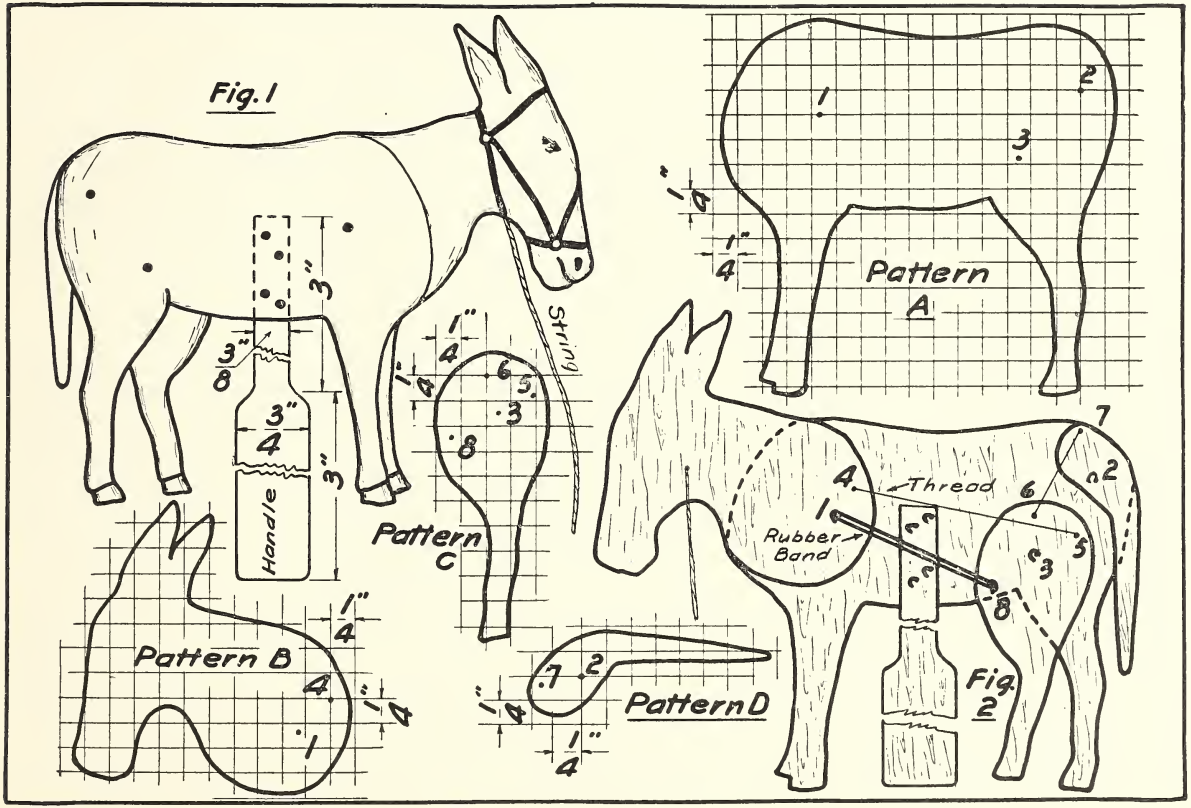


Fig. 1
3"
3/8
3"
4
3"
Handle
String
1"
4
1"
4
6
5
3
8
Pattern C
Pattern B
1"
4
4
1
1/4
1/4
Pattern A
1
2
3
1"
4
1/4
7
2
Pattern D
1/4
1"
4
7
4
Thread
6
2
1
Rubber Band
5
3
8
Fig. 2

TIN-LINED FERN BOX

This box is not intended for a porch box, but is designed for use on a window ledge or table. The advantage of being able to make a box of this kind lies in the fact that it may be made to suit a particular place in the house. If one is bought, it is necessary to accept the size made, regardless of whether or not it is adapted to the use to which you wish to put it.

Material

If the box is to be painted, use almost any kind of wood. If it is to be stained, select a wood that will give the best results with the stain you wish to use. Line the inside of the box with tin.

Construction

1. First get out the material for the sides, ends, and supports. Sandpaper well, and assemble with brads.

2. The tin box may be made from a can similar to a 5-gal. varnish or oil can. Lay out and cut the three pieces as shown in the drawings of the patterns; then bend the pieces on the dotted lines.

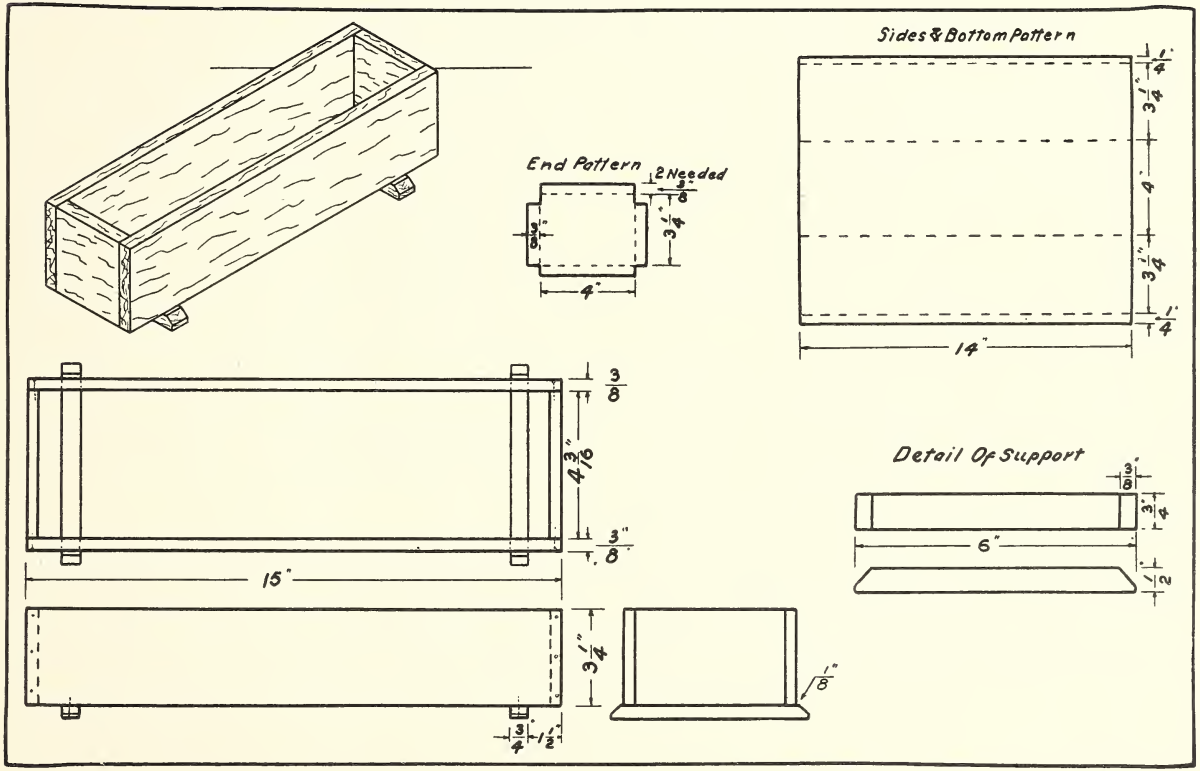
3. The bending may be done by placing the tin between two pieces of wood clamped together, then pounding the tin lightly with a hammer. Bend and press the upper edges of the box flat against the sides and ends of the box. This gives a smooth edge and prevents possible injury that might result if the edge were left sharp.

4. Fasten the ends to the sides and bottom with solder. This is not a difficult operation and may be done with an ordinary soldering kit purchased in a ten-cent store.

Finish

1. The inside of the tin box should be painted to keep it from rusting. It is well to punch several small holes in the bottom for ventilation.

2. If the box is to be painted, choose a color to match the woodwork in the room as nearly as possible. If a stained finish is desired, it is important that the sandpapering be especially well done, being very careful not to sand across the grain.


Sides & Bottom Pattern
1/4"
3 1/4"
4"
3 1/4"
1/4"
14"
End Pattern
2 Needed
3/8"
3 1/4"
Cut
4"
3/8"
4 3/16"
3/8"
15"
3 1/4"
3/4"
1 1/2"
1/8"
Detail Of Support
3/8"
3/4"
6"
1/2"

TELEPHONE PAD AND GROCERY LIST

These two articles can be used in almost every home. Frequently used telephone numbers may be recorded on the pad for ready reference, and the grocery list is invaluable in quickly calling to mind necessary items when about to go on a shopping tour, or when ordering by telephone.

Material

Wood, paper, brass-headed upholstering nails, and used matches are required.

Construction

1. It should be observed that both articles have much in common in their construction. It will be well, then, to organize your work so that similar operations may be done on both pieces in order.

2. Reduce the wood for both pieces to the proper dimensions; lay out the corners, noting that the dimensions vary in each piece. Remove the stock at the corners with a chisel if you have one; if not, it may be removed with a saw. It will be necessary, however, to smooth the surfaces with sandpaper, sanding both pieces well, remembering to work with the grain.

3. Both pieces may be suspended in the same manner, either by means of screw eyes as shown, or by boring a small hole near the top. Finish as directed.

4. Next, prepare the paper and fasten it to the wood parts with a small drop of glue at each corner, or by means of brass-headed upholstering nails. Thumb tacks also may be used, and they have the advantage of being easily removed if it is desired to change the paper lists.

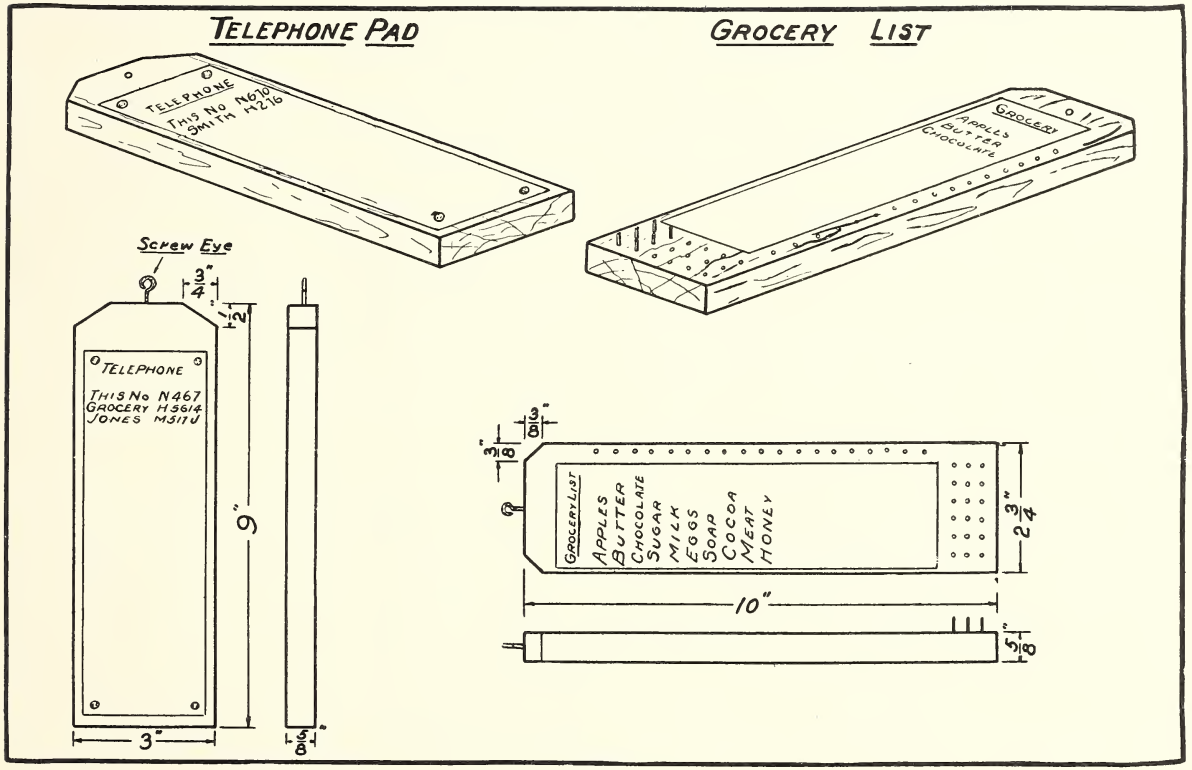
5. A small hole must be bored opposite each item on the grocery list, so the listing of items should be done next in order to know where to bore the holes. Make the pegs from pieces of used matches cut to lengths of ¾ in. In order to care for the pegs when not in use to mark a needed item, bore small holes in the bottom of the board.

Finish

If the wood is left natural, it will become quickly soiled from handling. The pieces may be stained and waxed, or they may be given one or two coats of thin shellac.

Use

Suspend the telephone pad near the telephone where it may be quickly referred to when calling. Hang the grocery list in a convenient place in the kitchen so that when it is observed that certain articles are needed, a small peg is taken from the bottom and inserted in the hole opposite the item wanted.


TELEPHONE PAD
GROCERY LIST
TELEPHONE
THIS No N616
SMITH H216
GROCERY
APPLES
BUTTER
CHOCOLATE
Screw Eye
3/4"
1/2"
TELEPHONE
THIS No N467
GROCERY H3614
JONES M317J
9"
3"
5/16"
3/8"
3/8"
GROCERY LIST
APPLES
BUTTER
CHOCOLATE
SUGAR
MILK
EGGS
SOAP
COCOA
MEAT
HONEY
2 3/4"
10"
5/8"

CANDLE HOLDER AND BANK

A candle should never be used without a holder. If used without one, and it is not extinguished when through using it, damage by fire may result. Moreover, unless there is something to catch the candle drippings, shoes and clothing may be badly soiled.

Material

Tin cans and soldering outfit are required.

Construction

1. The can for the candle holder should be 4⅞ in. in diameter. Lay out pattern B on a sheet of paper and cut it to shape. Then fold the paper pattern around the can, mark along the edge of the pattern on the can with a sharp-pointed instrument, and cut the can to shape with tin snips.

2. Next, lay out pattern A, bend the scalloped edge at right angles to the face of the piece and solder it to the inside bottom of the can.

3. The handle C is very simple. The easiest way to bend to the dotted lines is to place the tin between two pieces of wood clamped together in a vise, and bend the edges to an angle of 90 degrees. Then remove it from the vise and finish the bending to 180 degrees on the bench. Form the handle by bending it over a round stick, such as a broomstick or a piece of gas pipe, then solder it to the can as shown.

4. For the bank a small baking powder can is suggested. Remove all the paper and lay out the small slot in the cover. The hole may be cut by driving small nails close together.

5. From another can, cut a piece of tin for pattern X, the purpose of which is to prevent the coins from being easily removed. After bending it to shape, solder it around the slot in the can cover.

6. Place the cover on the can and solder it in place.

7. To remove the money from the bank, run a hot soldering iron around the top to melt the solder, or cut the bottom open with a can opener.

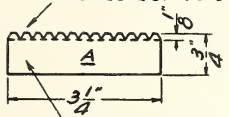
Finish

The candle holder may be used without any decorations, but its appearance will be much improved by giving it two coats of paint with fine border lines of a contrasting color. A flower design may be added with good effect.

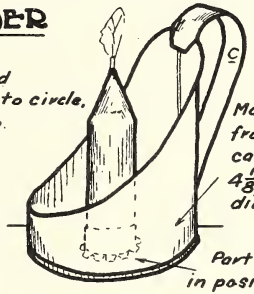
The bank will also be more attractive if it is painted.

CANDLE HOLDER

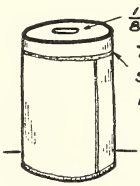
Cut as shown Bend on dotted line, then to circle, and solder to bottom.



Candle holder.

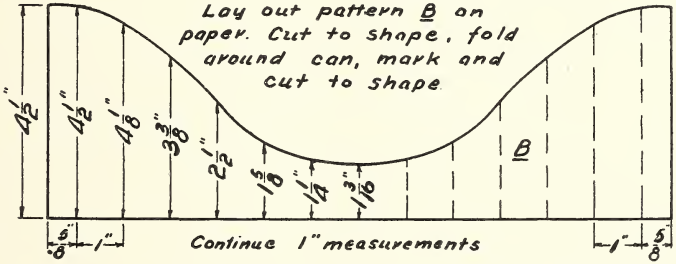


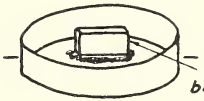
BANK



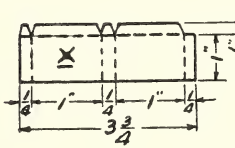
Make from ordinary baking powder can

Lay out pattern B on paper. Cut to shape, fold around can, mark and cut to shape



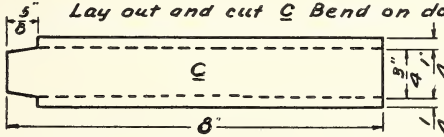


Sketch showing inside of cover. Part X to be bent to shape and soldered to inside of can cover



Bend to shape on dotted lines.

Lay out and cut C Bend on dotted lines to 180°. This stiffens handle Form shape as shown in sketch and solder.



Part X is necessary to keep coins from being shaken out.

BIRD HOUSES

It is impossible to make individual drawings for houses for the many different kinds of birds. The table which accompanies this drawing, however, shows the size of the openings for the ordinary birds, distance of the openings from the floor, the inside dimensions for each room, proper placing of perches, and the height to place the houses from the ground. With this information available, it is possible to vary and modify the designs shown here to suit almost any condition.

Material

The best material is that taken from shoe-packing cases. Boards from these cases usually are about the proper thickness, are planed smooth, and are white pine, which is easy to work.

Construction

1. No particular order for getting out the stock is necessary. Study the drawing and select the type of house you prefer. Get the stock to the proper dimensions, then sandpaper all pieces which have rough spots.

2. Assemble with brads all parts except the bottom. While the drawings do not show it, the bottom should be held in place in a manner that will make its removal easy. This is desirable so that the bird house may be cleaned when necessary. It is well, sometimes, to remove the roof.

Finish

The houses may be painted or not, just as one chooses. If left unpainted, it will add to them if they are covered with bark. If they are to be painted, choose as colors white, gray, dull red, green, or brown.

Useful Information

The houses should be made and placed before the arrival of the birds in the spring, so they will have a chance to weather and also that the fresh-paint smell may disappear.

To get birds to occupy the houses, it is first necessary to attract them to your neighborhood. This may best be done by offering proper food, as bread, grain, table crumbs, peelings, bits of cabbage, and suet hung on the branches or rubbed into the bark of trees.

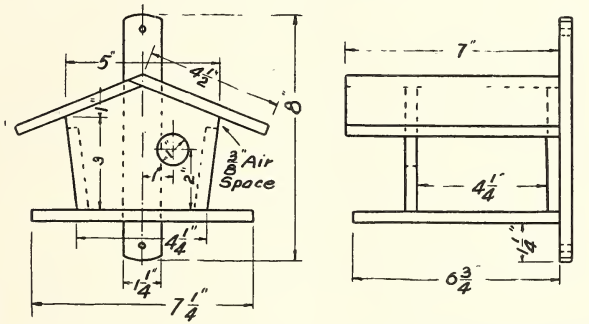
The house cat is a menace to birds. It, therefore, is necessary that you watch all cats and provide means of protecting the birds where they are feeding.

In the summer provide a place for the birds to bathe and drink.

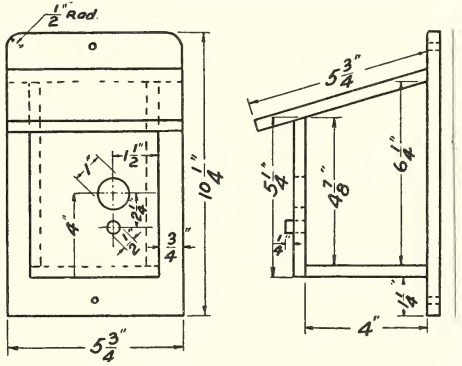
If you want to attract martins, it will be necessary to provide a shelter with many rooms, because they prefer to live in colonies. Other birds prefer to inhabit single homes.

BIRD HOUSES

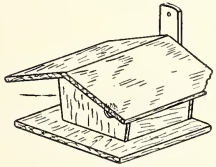
WREN BUNGALOW



WREN BOX

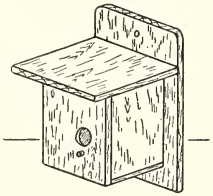


All stock $\frac{3}{8}$" thick



BIRD	OPENING	SIZE	PERCH	HEIGHT
BLUE	2" AND 4" UP	6"×8"×6"	1" BELOW HOLE	10' TO 15'
WREN	1" AND 1 TO 3" UP	4"×4"×4"	¼" LONG	6' TO 20'
MARTIN	2¼"×3" AND ½" UP	6"×7"×6"	WIDE	12' TO 15'

UP FROM FLOOR



MARBLE GAME

Marble games always are of interest to boys. There are many kinds of games, good and bad; but this is a *good* game which is not only interesting to use but also interesting to make.

Material

Soft wood of fairly good quality is required.

Construction

1. Study your drawing, and get out the stock so that the material will be used to the best advantage. It often is possible to save material by considering all the pieces at one time rather than work each piece separately without regard to any other piece.

2. To make the piece in which the openings are cut, first lay out a line 1 in. from the bottom edge. On this line, locate the centers of the openings very accurately. Hold the piece in the vise crosswise of the grain, and bore holes to form the back of the openings. The boring should be done partly from each side to avoid splitting. Remove the rest of the stock with a backsaw and then lay out and cut the corners.

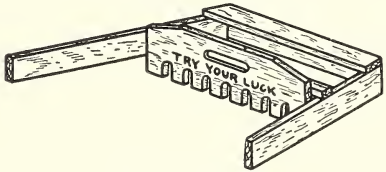
3. The ends of the piece which lie across the top of the side pieces, to hold them together, are not square. The best way to cut these pieces will be to nail them in position and then saw off the material that extends beyond the sides.

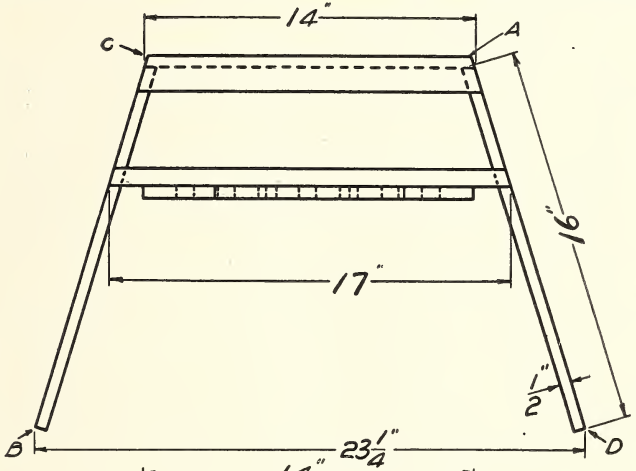
4. The parts are held together with nails. There are no square corners, so it will be necessary to test to see that the distance from A to B is the same as from C to D. Drive only one nail in each piece, which will permit the pieces to turn, then, when the distances referred to are equal, drive the rest of the nails.

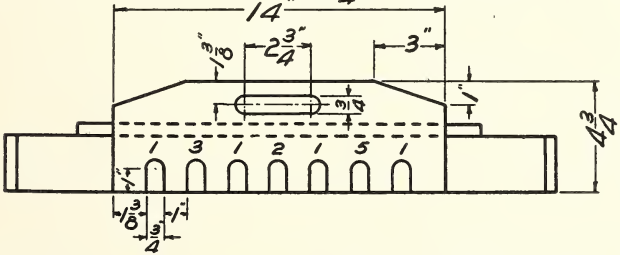
Use

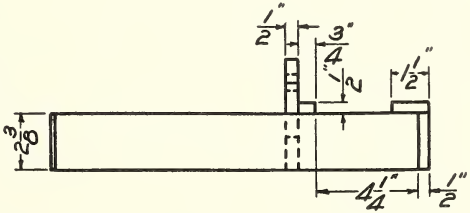
You may give each hole any value you wish. Set the game in a convenient place, determine the distance from which the players are to roll the marbles, then draw a line. Each player must remain back of this line and roll the marbles into the holes which count the most. Any number can be assigned as the total which must be counted in order to win the game.

MARBLE GAME


TRY YOUR LUCK


14"
A
C
16"
17"
1/2"
B
23 1/4"
D


14"
3/8"
2 3/4"
3"
1"
3/4
4 3/4
1
3
1
2
1
3
1
1/4"
3/8
1/4
3/4


1/2"
3/4"
1/2
1 1/2"
2 3/8
4 1/4"
1/2"

STRING WINDER

In most homes, pieces of string which come around packages are saved, but too often they are thrown loosely into a drawer. Then when a piece is wanted, it usually is necessary to spend considerable time getting the supply untangled. A better way would be to place the pieces on a winder like the one shown in this drawing.

Material

Wood, brads, screws, and a safety-razor blade are necessary.

Construction

1. Make the back piece first, laying out the corners with a compass, and remove the stock with a chisel.

2. Parts B and C are alike in shape, differing, in that part C is made of two thin pieces of stock. Before gluing the pieces together, determine the location of the blade, and remove a small portion of stock. Also cut the notch exposing the blade, as it is impossible to cut it with the blade in place. Insert the blade and glue the pieces together.

3. In making parts D and F, remember to bore the holes by working partly from each side. Start boring from one side, and, when the point of the bit comes through on the other side, remove the bit and finish boring from the opposite side.

4. With the bit used for boring holes in D and F, also bore a hole in a piece of hard wood. From a piece of soft wood bring part E, the shaft, approximately to shape. Finish by driving the piece through the hole bored in the hard wood. This will give it a smooth, well-rounded shape, though it may need to be touched up slightly with sandpaper. The shaft should turn easily in parts B and C, but it should be a press fit in parts D and F.

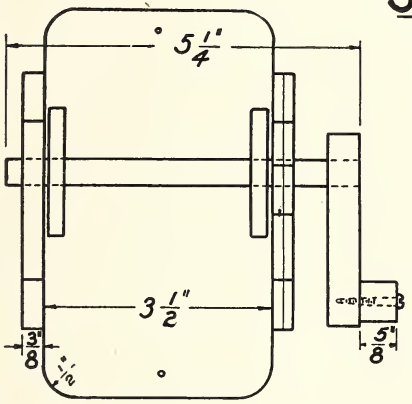
5. Assemble the parts by bradding C in place, then place parts D on the shaft, and slip one end of the latter into the hole in C. Place the other end in part B, then fasten the latter to A. Parts D, which are necessary to keep the string from binding against B and C, may be secured to the shaft with a drop of glue. While the drawing does not show this, it might be well to use washers between parts D, B, and C.

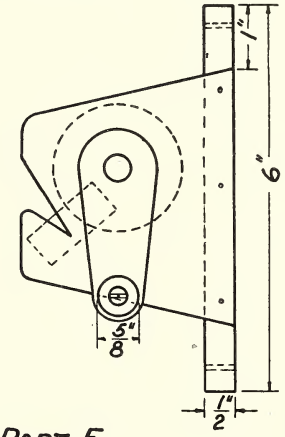
6. Fasten the handle to the crank with a screw. Slip the crank on the shaft and fasten it with a pin driven through the crank into the shaft.

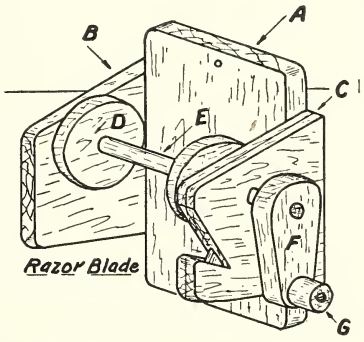
Finish

While not necessary to do so, the winder will look better if it is given a coat of shellac or is painted. If this is done, the parts should be treated before assembling.

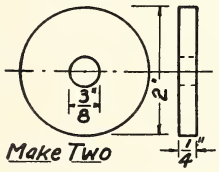
STRING WINDER





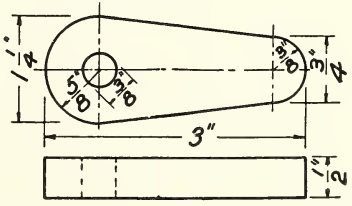


PART D

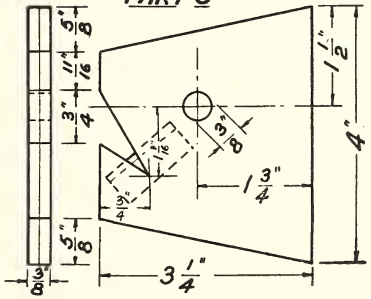


Make Two

PART F



PART C



YARN REEL

Knitting cannot be done directly from the skein that the yarn is in when purchased. It must be wound into a ball and, of course, if mother and sister do the knitting, they think it is but right that the boy in the house hold the yarn while it is being wound. Any boy who has to perform this duty will welcome a device which will relieve him of the work of holding the skein. This holder will do that very thing.

Material

Wood, a washer, a 12-penny nail, and a dowel rod are required.

Construction

1. Make a stock list, and get out all the pieces first to their over-all dimensions. Next, lay out and cut the pieces to shape to their over-all dimensions.

2. Select those pieces through which a hole is to be drilled for the nail. Locate the center for the hole on both sides of each piece, and drill from both sides to insure their fitting squarely on the nail. In part A, drill a small hole slightly larger than the main hole for the head of the nail.

3. Now bore the holes in the arms for the pegs which hold the yarn in place, at an angle of about 70 degrees. The pegs may be made of dowel stock, or they may be made by rounding the corners of a $\frac{3}{8}$-in. piece of wood and finished with sandpaper.

4. Parts A and B may be fastened together with brads, but small screws will be more satisfactory. On part C, fasten part F exactly in the center, after which locate and fasten parts D as shown in the lower right of the drawing. On the top of these pieces fasten part E.

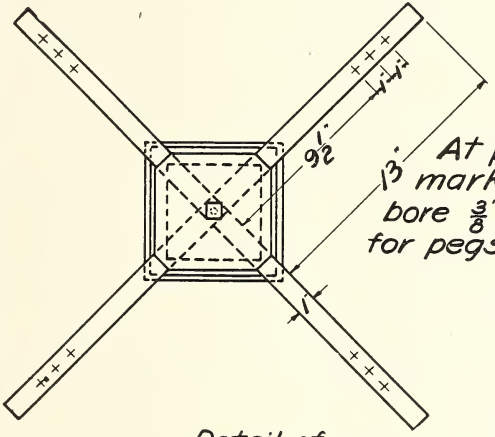
5. Assemble by inserting the nail through A and B; place a washer over the nail; place the other parts in position over the nail, and finally insert the arms.

6. The end of the nail should be protected by a piece of wood. No drawing is shown for this part, as none is necessary. Take a small piece of wood, bore a hole in it just large enough for the nail, and smooth the top with sandpaper.

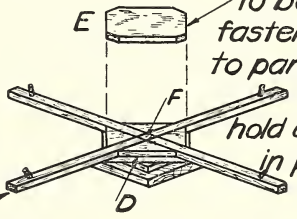
Use

The skein of yarn to be wound into a ball is placed over the pegs and as the reel will revolve freely, it is an easy matter to transfer the yarn from the skein into the ball. The pegs are removable and adjustable to provide for different sizes of skeins.

YARN REEL.

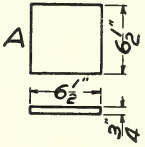


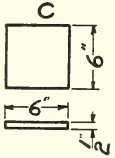
At points marked + bore ⅜" holes for pegs.

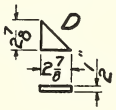


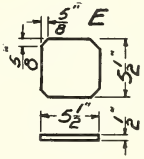
To be fastened to parts D to hold arms in place.

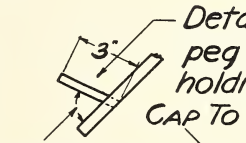
ALL ARMS ARE REMOVABLE







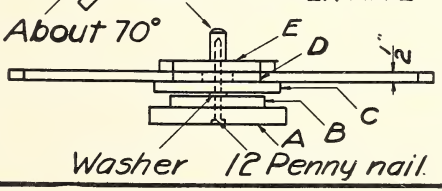


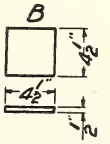


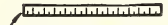
Detail of peg for holding yarn.

CAP TO COVER NAIL

About 70°







Lay off inches and half inches on one arm.

Parts D and F are to be fastened to C as shown at

CLOTHESPIN BLACKSMITHS

The common clothespin would not impress most people as being a material from which toys can be made, but very attractive jumping jacks, tops, dolls, etc., can be easily made from the household supply of pins. The toy shown here should be very interesting to anyone, and it is not hard to make.

Material

Clothespins, common pins, iron wire, pieces of cloth, some kind of coloring material, and thin wood.

Construction

1. Select four good clothespins, that is, of good shape. With a saw or a knife, cut off two of the pins 1 in. from the head end. These are to be used for the hammers, while the remaining part of one of the pins will be used for the anvil.

2. Next, make the thin strip of wood for the handles to operate the toy.

3. Use two pieces of black iron wire for the hammer handles.

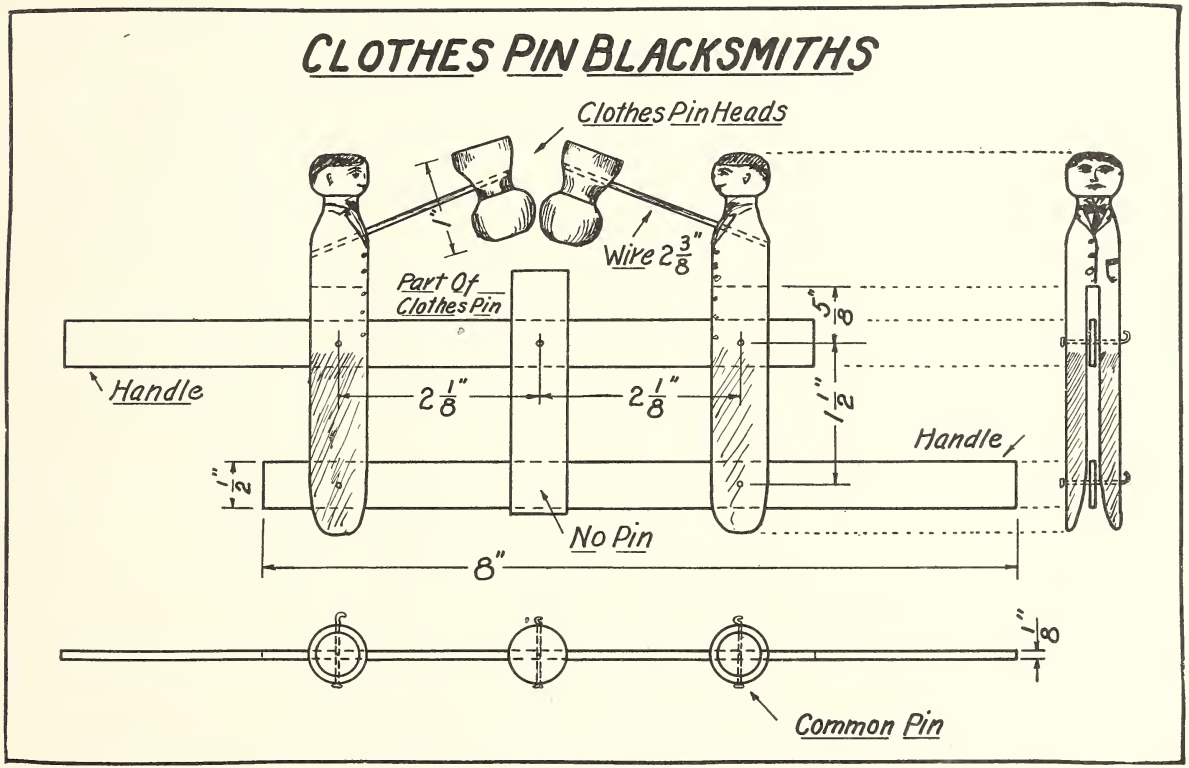
4. Next, bore the holes in the various pieces for the hammer handles and for holding the parts together as shown in the drawing. The best tool for this work is the bradawl.

5. Assemble the pieces with common pins. Insert the pins in the proper places, cut off with a pair of pliers so that just enough is left protruding to permit of bending over on the end to hold the pin securely in place, but allow enough for free play of parts when the toy is in use.

6. Clothes may be made for the toy, if desired, or the pins may be painted. One or the other should be done in order to make the toy more attractive.

Operation

Grasp one of the thin handles in each hand. By alternately pushing and pulling, the blacksmiths are made to strike with the hammers on the anvil.


CLOTHES PIN BLACKSMITHS
Clothes Pin Heads
Wire 2 3/8"
Part Of Clothes Pin
Handle
2 1/8"
2 1/8"
5/8"
1 1/2"
Handle
1/2"
No Pin
8"
1/8"
Common Pin

SIDEWALK COASTER

Some boys like to deliver papers on skates, but considerable time is wasted in going up and down steps and stairs in flats. The sidewalk coaster will prove more satisfactory in many ways.

Material

Wood, trucks from an old roller skate, and a screen-door spring are required.

Construction

1. First make the footboard. If your piece of stock is not quite the required length, the given dimension may be shortened.

2. Make the seat-post and fasten it to the footboard with screws or nails. Round the corners of the seat board, and if you can, have a pad made and fastened to the seat board.

3. The steering post is shown 29 in. long, but for a tall boy this may be made from 4 to 6 in. longer. Round the handle nicely and fasten to the post.

4. No lengths for the braces are given because scraps of almost any pieces of wood may be used. Fasten the braces with screws.

5. A brake is not necessary, but it is handy and adds to the appearance. A round-headed screw holds it in place. Bore the hole in the brake lever slightly larger than the screw, and separate from the foot board with washers.

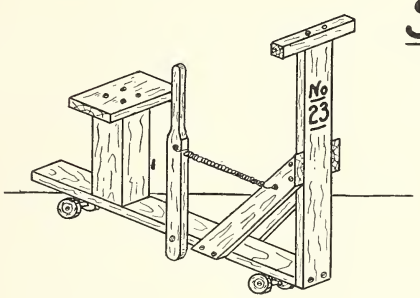
6. Use a screen-door hook to hold the brake lever in position.

7. Remove the trucks from an old skate, and fasten to the footboard as shown, with screws, nails, or strips of tin, depending upon the construction of the skate used.

Finish

The coaster should be made as attractive as possible, so it is to be painted. Some boys like a variety of colors, and some like but one color. Use your own initiative in working out the color scheme.

SIDE WALK COASTER



CROCHET-BALL HOLDER

The fact that this article is one which will not be seen in many homes ought to make it a very desirable thing to have. It is a very convenient holder for mother or sister.

Material

Wood that will take a good finish, as for instance, walnut, should be used.

Construction

1. Start with the base. Lay out the corners and the cut-outs for the uprights. Remove material in the cut-outs; then round the corners.

2. Cut the material for the upright pieces to the over-all dimensions. Lay out and bore the holes at the top of the pieces. Lay out the design for the balance of the piece, and then cut to shape. Do this work with special care, keeping in mind the fact that the holder will occupy a prominent place and defects, therefore, will be quickly noticed.

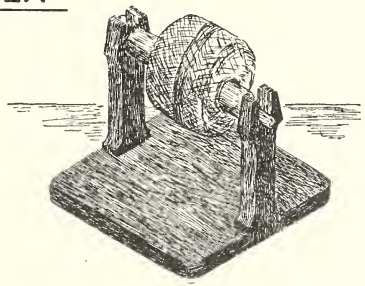
3. The part which holds the ball is the most difficult to make. If a turning lathe is available, so much the better, but if not, proceed as follows:

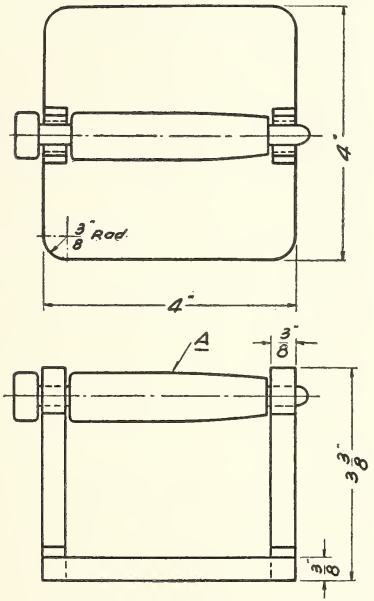
Lay out the piece and square it up. Next plane to an octagon; then gradually remove the remaining edges. The small diameters will be the hardest to work up. Cut these parts with a sharp knife, making the depth of the cut the same all the way around. Keep the shoulders square, and do not rush the job. It will require time to do good work. When the knife work has been carried as far as possible, finish with a file.

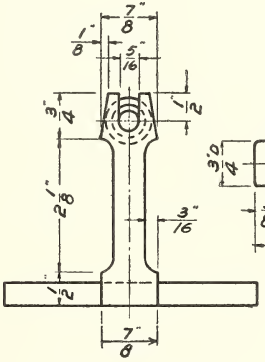
Finish

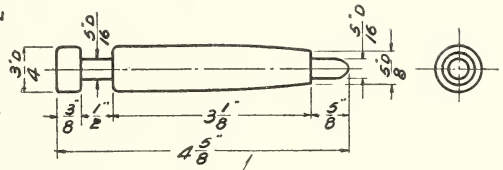
Stain, oil, or wax to suit, depending largely upon the kind of material used.

CROTCHET BALL HOLDER









DETAIL OF A

DANCING JIM

This workable toy is not difficult to make. Its operation is easy and very interesting; hence, you will have a great deal of fun without much hard work beforehand.

Material

Wood, brads, and pins are necessary.

Construction

1. The patterns will need your attention first. The ones shown should be only suggestive to the boy with initiative. Endeavor to create a design of your own, keeping within the dimensions given. In fact, you will have a lot more fun if you will try to design your own characters.

2. To plane the material to the thickness shown will require something more than an ordinary bench stop for holding the pieces while working. One way is as follows: Into a piece of perfectly flat board, drive two brads so they will extend just enough to make a stop for the wood to be worked on.

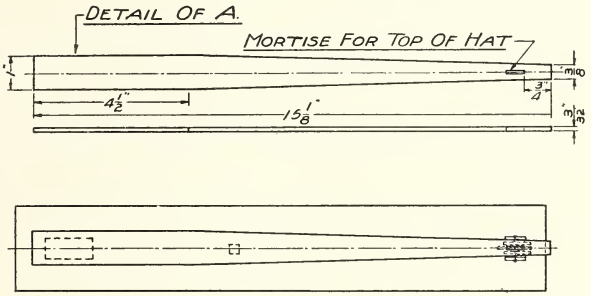
3. Lay out the patterns on the wood, and then very carefully cut to shape with a coping saw.

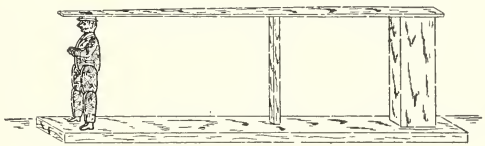
4. The parts of the figure are held together with pins cut to the proper length and bent as shown. Make the holes just large enough to permit plenty of freedom of the parts.

5. Next, make the base which is a simple rectangular piece. A chamfer may be planed around the upper edge, if desired. Part A should also be made from the thin stock used for the parts of the dancer.

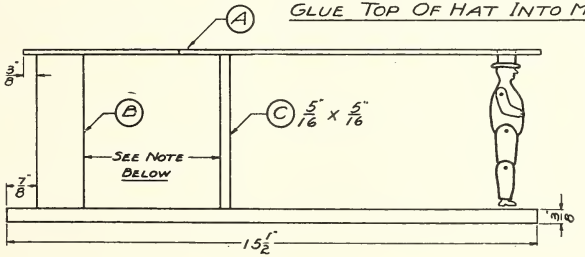
6. Give careful attention to the note on the drawing referring to part C.

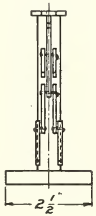
DANCING JIM.

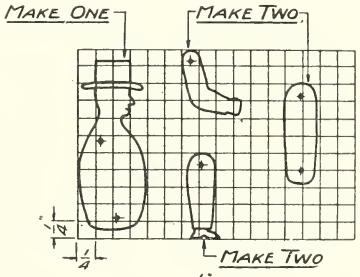




ASSEMBLE JIM WITH, PINS, A, B AND C WITH BRADS, AND GLUE TOP OF HAT INTO MORTISE.

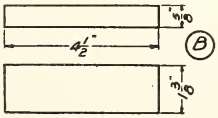






STOCK 1/8" THICK

AT POINTS MARKED + DRILL HOLES FOR PINS.



NOTE—

BECAUSE OF VARIATION IN CONSTRUCTION, AND QUALITY OF WOOD, A PIECE "C" IS PLACED AT A POINT THAT WILL GIVE THE BEST VIBRATION OF "A." THIS MUST BE DETERMINED BY TRIAL. ——— TO MAKE JIM DANCE, TAP "A" QUICKLY WITH FORE AND MIDDLE FINGERS, ALTERNATELY, IN FRONT OF C.

TEDDY-BEAR BLACKSMITHS

If attractively painted, you will find this toy one of the most interesting Christmas gifts you can make. In fact, it will be a very welcome gift at any time.

Material

Wood and brads are required.

Construction

1. Select the material, and begin by making the sticks to which the bears and anvil are attached.

2. Next, lay out the pattern for the anvil with a sharp pencil. Do the straight cutting with a sharp backsaw, the curved parts with a coping saw, and file the anvil horn to a conical shape.

3. Make the hammers next. They are small, and careful work will be required for a successful job. Use a backsaw and a coping saw for the cutting, with possibly a sharp jackknife for smoothing up some parts.

4. Now for the bears. Get out the stock and plane to the required thickness; then lay out the patterns by tracing through the squares. Remember that you are trying to make the figures look like bears, so be careful in tracing the outlines and in cutting them to shape. The coping saw will be used for the outlines and the backsaw and chisel for cutting the grooves.

5. If all the parts are cut accurately they should fit, but as certain irregularities will no doubt occur in the cutting, it will be advisable to test them before assembling. Adjust the bears so that the hammers will strike in the center of the anvil, and adjust the hammers so that they will clear each other when striking.

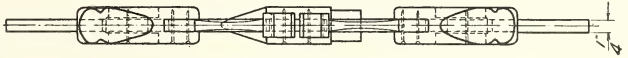
Finish

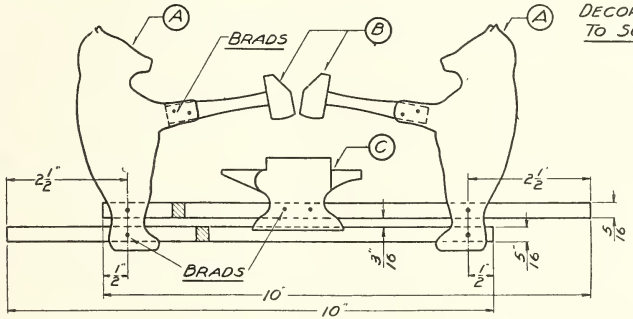
Paint to suit, though it is suggested that the anvil be black, the bears brown, with eyes, mouth, etc., black. The levers will look well in green.

Operation

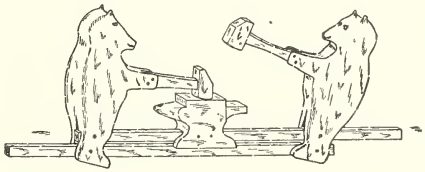
Grasp the levers in the fingers, and push and pull alternately. This will cause the bears to strike on the anvil with the hammers.

TEDDY BEAR BLACKSMITHS.

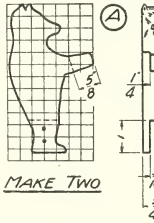


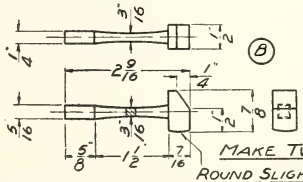


DECORATE TO SUIT



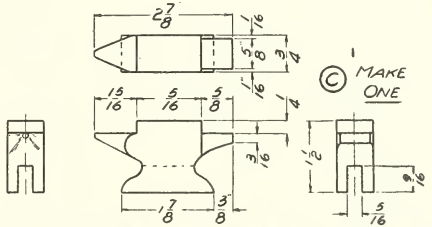
LAY OUT $\frac{3}{8}$" SQUARES ON STOCK AND TRACE THRU THEM AS SHOWN. ROUND EDGES AND FORM HEAD TO LOOK AS MUCH LIKE BEARS AS POSSIBLE





MATERIAL - WOOD.

OWING TO POSSIBLE VARIATION IN PARTS, DUE TO IRREGULAR CUTTING, IT WILL BE BEST TO TEST THE POSITION OF PARTS A·B·C TO EACH OTHER BEFORE FASTENING IN PLACE



BOOK TROUGH

This is a very attractive piece of furniture for any home. There are many different designs for an article of this kind, but none of them will prove any more satisfactory than this one.

Material

Although oak would be the most suitable wood for this purpose, a wood that will fit in with the rest of the furnishings should be considered. Screws will be needed to assemble the pieces, and stain to finish it.

Construction

1. Prepare the stock to the over-all dimensions. Lay out the angles on the end pieces before shaping the outside, as it is very necessary that the straight edges are square with each other. Be sure that both ends are laid out exactly alike, otherwise the trough will not set evenly.

2. After the positions of the stretchers have been laid out as directed, draw a line through the center of the space the stretchers will occupy, and on this line drill holes for the screws which are to hold the parts together.

3. Lay out and cut the designs on the ends. This work can be done directly on wood, if desired, though, as a rule, it is advisable to first make a pattern from thin cardboard, especially if more than one trough is to be made.

4. Do all cutting with a coping saw. The design at the upper part of the pieces can be cut by first boring small holes in the outline, inserting a coping saw, and then sawing carefully to the outline.

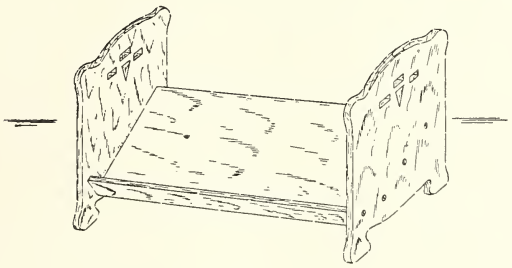
5. Sandpaper all pieces, being particularly careful with the end grain of the end pieces. These must be perfectly smooth if a good job of staining is to be obtained. Do all sandpapering with the grain, and remove all rough spots of any kind.

6. Assemble all parts with screws, remembering that holes must be drilled into the ends of the stretchers.

Finish

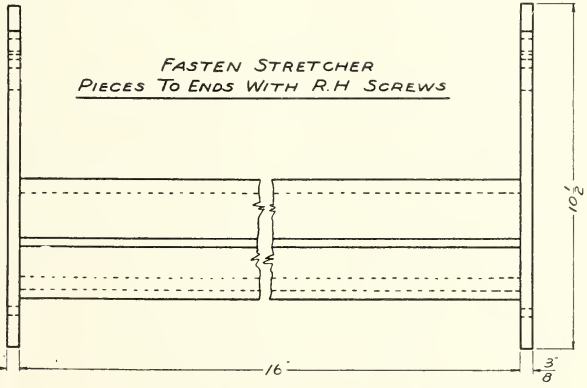
Use a stain that will make the book trough harmonize with the table or other support on which it is to be placed. After staining, apply wax or two thin coats of shellac, as desired. When thoroughly dry, rub down the shellac with almost worn-out, fine sandpaper.

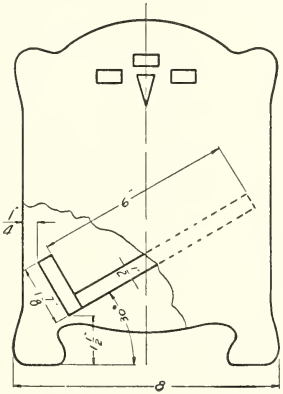
BOOK TROUGH.

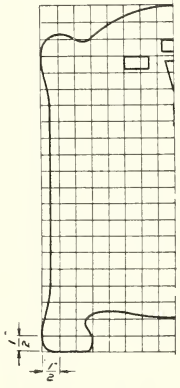


MATERIAL - OAK
FINISH TO SUIT

FASTEN STRETCHER
PIECES TO ENDS WITH R.H SCREWS







PICTURE FRAME

Many of us have one or more pictures tucked away somewhere which should be framed and placed where they can be seen. Since it is not always desirable to have them on a wall, this holder, which will permit placing a picture on a table, dresser, etc., will be very welcome.

Material

Wood, screws, and stain or paint are necessary. Select the wood according to whether the holder is to be stained or painted.

Construction

1. Get out the base first. Lay out the mortises on both sides and cut them before cutting the bevel, etc. Bore a hole in the center, and remove the rest of the stock with a chisel, working from both sides.

2. Lay out and cut the tenons on the uprights. They must be cut so they will fit accurately and snugly into the mortises, otherwise the work will not be a success. Next, locate and drill the holes for the screws.

3. The frame will be the most difficult to make. Because the stock is small, the best way to remove the stock for the groove into which the glass will fit is by laying out the groove with a sharp marking gauge, then cutting out the stock with a chisel.

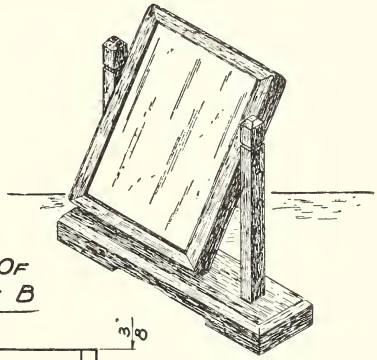
4. Some try-squares have a 45-degree angle. If you have such a try-square, lay out the angle for the corners with it. If you have none, lay out the angle according to the detail in the drawing.

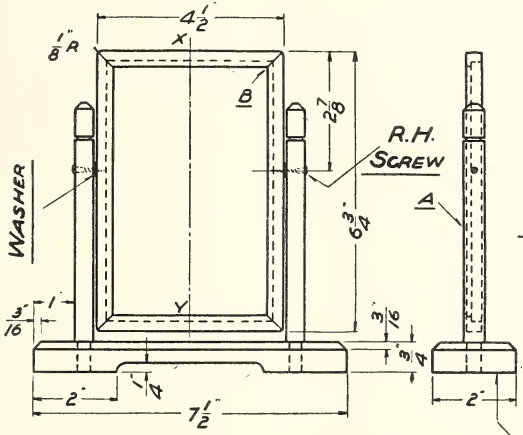
5. When all the parts fit satisfactorily, sand them well and assemble. Glue the uprights to the bottom, and fasten the frame together with brads and glue. The latter operation will be a good test of your skill and perhaps your patience.

Finish

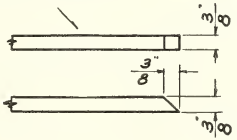
If the frame is to be painted, choose your color with care. Many attractive colors are obtainable in the new lacquers as well as beautiful finishes. If the piece is to be stained, remember that the stain must be rubbed off after being applied. Finish with two coats of thin shellac or wax.

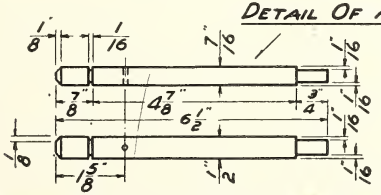
PICTURE FRAME





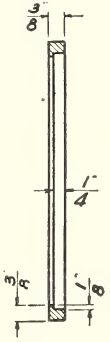
DETAIL OF JOINT AT B





COVER WITH SOFT CLOTH

SECTION THROUGH XY



POST BOX

It is often desirable to place a plant on a post or a porch ledge where there is not room for the ordinary plant box. This type of box is well suited for that purpose.

Material

Cypress lumber, 8-penny casing nails, and paint are required.

Construction

1. Make the end and side pieces by first reducing to over-all dimensions, then laying off a center line on each piece, from which measurements are made on each side for the top and the bottom dimensions. Connect these points with a pencil line; then saw accurately to that line.

2. Assemble the ends and sides with 8-penny casing nails. Set the nail heads slightly below the surface of the pieces with a nail set.

3. Chamfer the bottom piece $\frac{3}{8}$ in. each way.

4. Fit the bottom to the frame by planing off the bottom of the frame so it will rest on the bottom without showing a crack. Assemble with nails, though screws will make a stronger job.

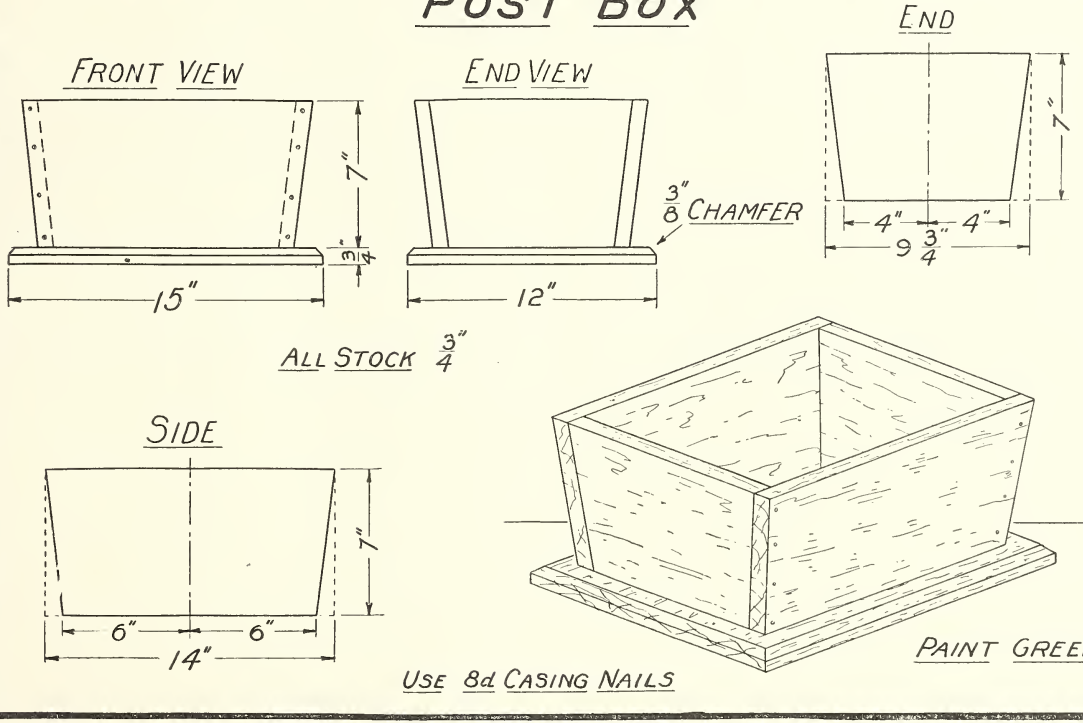
5. After assembling, plane the top edge so the parts are even; then round the edges. Sandpaper all parts.

6. If the box is to be placed where seepage is not harmful, a hole may be bored in the center of the bottom.

Finish

The box should be painted. If it is not desired to have the box painted to match any particular wood, it will look very well in green.

POST BOX


FRONT VIEW
7"
3/4"
15"
END VIEW
3/8" CHAMFER
12"
END
7"
4"
4"
9 3/4"
ALL STOCK 3/4"
SIDE
7"
6"
6"
14"
PAINT GREEN
USE 8d CASING NAILS

CHRISTMAS-TREE STAND

A Christmas-tree stand really has become a household necessity. Many devices may be used to support a tree, but the handy boy wants something he knows is well made and well finished.

Material

Any fairly good grade of wood may be used. The thickness of the pieces may vary, though the dimensions shown in the drawing are recommended.

Construction

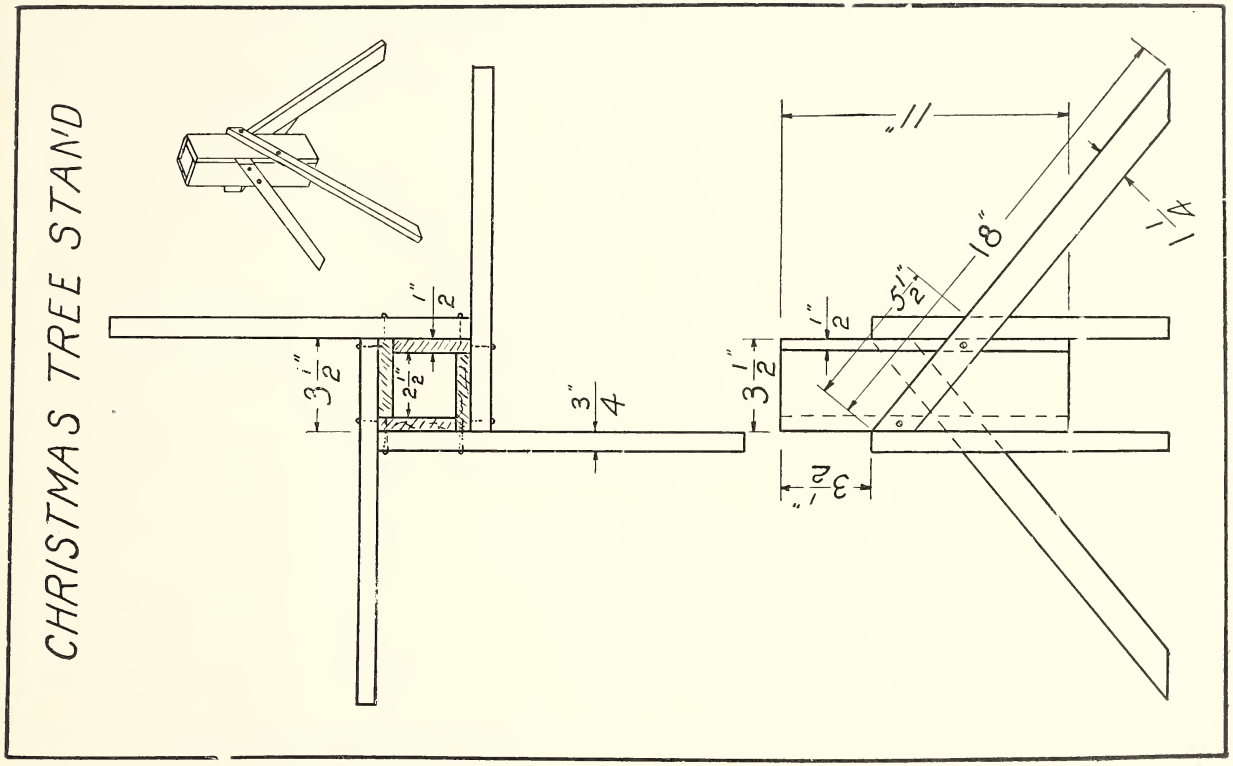
1. Make the box first. Fasten the pieces together with screws, as nails may pull out in case a strain is put upon the stand when placing the tree in position.

2. Make the legs next. Assemble with screws, without cutting the bottom ends as they are shown in the drawing, and for which you will observe there are no measurements.

3. To mark the bottom ends of the legs for sawing, set the stand on a level surface. Take a piece of board about 1 in. thick, or less, lay it on the surface, and move it up against the leg of the stand. Mark a line across the leg, using the surface of the board as a guide. Do this with each leg, then cut carefully to shape with a saw.

Finish

Of course, the stand should be painted if it is to be used in such a way that it will be exposed. Red, brown, or green make attractive colors.


CHRISTMAS TREE STAND
1"
2
3 1/2"
2 1/2"
3"
4
3 1/2"
1"
2
5 1/2"
18"
1 1/4"
3 1/2"

TOOTHPICK TOYS FOR GIRLS AND BOYS

Making toothpick toys is great fun for little folks, but it can also be enjoyed by adults.

Material

Common toothpicks and peas are required. Flat toothpicks are preferred.

Construction

1. It will be necessary to prepare the peas by soaking them in water. The length of time to soak them will have to be determined by trial. They should be soft enough to permit the toothpicks to be inserted easily, but they should not be so soft that the skin will peel off.

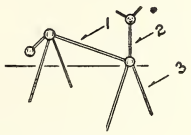
2. A sharp penknife may be used to sharpen the ends of the toothpicks, and also to cut them to the different lengths. Cut and sharpen a number of them to quarter, half, and three-quarter lengths. Sometimes it is desirable to thread a pea to the center of a toothpick. To do this, it will be necessary to whittle the toothpick very thin, being careful not to get it so thin that it will easily bend or break.

3. A table in the lower right-hand corner of the drawing explains to what the different figures on the drawing refer.

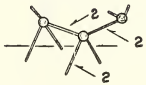
4. Begin with the simplest figure, and proceed to the more difficult. Other kinds of animals and structures may be made to suit.

TOOTHPICK TOYS FOR GIRLS AND BOYS.

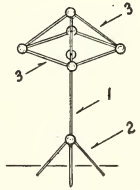
TOOTH PICKS and PEAS



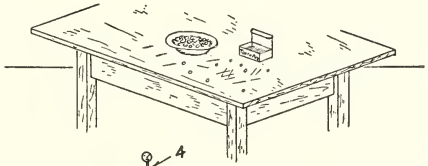
HORSE

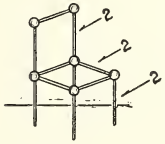


DOG

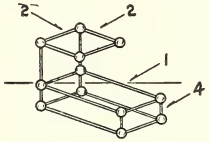


FLOOR LAMP

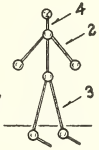




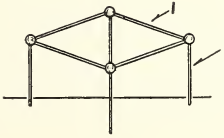
CHAIR



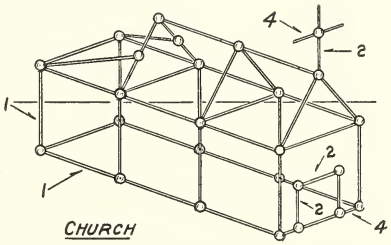
BABY BED



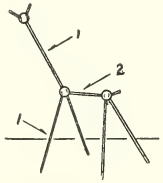
MAN



TABLE



CHURCH



GIRAFFE

1 = 1 Tooth Pick
2 = $\frac{1}{2}$ Tooth Pick
3 = $\frac{3}{4}$ Tooth Pick
4 = $\frac{1}{4}$ Tooth Pick

TOOL CASE

Many boys have their own set of tools, but not every boy has a proper place to keep them. Instead of a complete set at one time, tools are often received as Christmas or birthday gifts, a piece at a time. As a rule, tools received one at a time are of a better quality than when they come in a set. To keep the tools in good condition and where they can be found when wanted, some sort of container is needed. This tool case will exactly fill that need.

Material

See the drawing for a list of the necessary materials.

Construction

1. Get out all the pieces with very well-made butt joints. The only angular pieces are those at the ends and they can be made without much trouble.

2. Assemble the box proper with 1-in. brads and glue. Be careful not to split the pieces when driving the brads, for it is necessary to drive them very near the ends of the pieces. One way of overcoming any tendency to split easily is to first drill small holes at the proper places with a bradawl. It is important that you test the box for squareness as you proceed, for, regardless of how well you may have done the work of squaring up the individual pieces, unless they are assembled properly, the box may not be square.

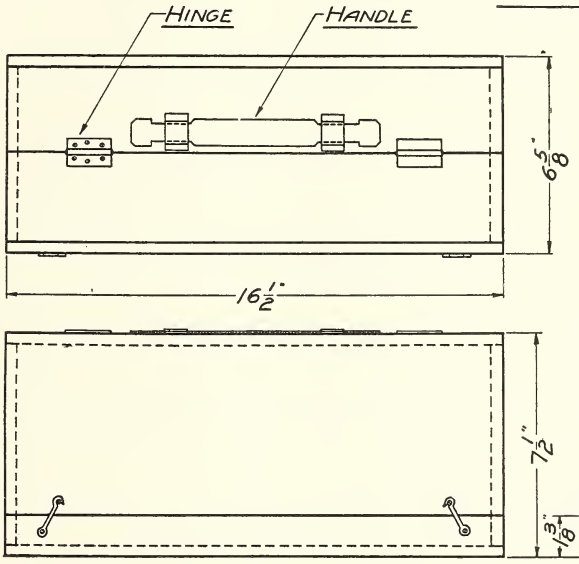
3. Be sure you place the hinges straight when fastening them on the box. Accurate work is necessary.

Finish

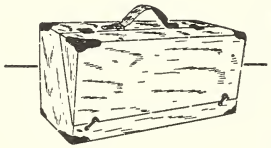
1. This includes the trimmings, which may be put on before the box is stained, if desired. They must be removed, however, when the box is being stained. This will prevent an ugly mark on a finished surface, as all holes can be bored and the trimming tried out while the box is still in the rough state.

2. To make a good job of staining, the box must be well sandpapered. Be sure you do not sand across the grain. Apply the stain in the usual way, and finish with two coats of shellac.

TOOL CASE



-CONTENTS-
10" BACK SAW
MARKING GAGE
14" JACK PLANE
6" TRY SQUARE
12" RULE
JACK KNIFE



MATERIAL- BASS OR GUM, HINGES, HANDLE
AS DESIRED, CATCHES, BRADS AND BRASS CORNERS.
ALL STOCK 3/8" THICK.

CHRISTMAS DECORATION

There is a wide variety of Christmas decorations, but the one described here is rather unusual. It is something you cannot buy, so its use will insure a decoration quite different from your neighbor's.

Material

The necessary materials are listed in the drawing. You need not make the box the exact size of the drawing — it may be made larger or smaller to suit material most easily obtained.

Construction

1. First make the box, noting that the top is wider than the bottom. Make the holes of a size to permit fitting into them the cans you will use. Cut these holes with a coping saw, first boring a hole in which to insert the saw. Tack the cans in place in the holes; then assemble the box.

2. If you have no hinges and do not wish to buy any, they may be made from a piece of strap, or leather from an old shoe. Make a hook from a piece of wire. Bore a few small holes in the backboard to admit air, provided candles, a lamp, or a lantern are to be used for the light.

3. Bore small holes in the top over the light, and suspend can covers with pieces of wire about two inches from the top of the box, over the candles, to protect the wood.

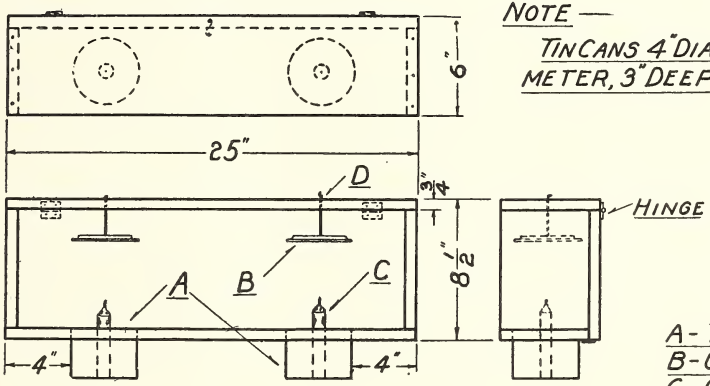
4. Make the front of the box from cardboard or heavy paper. Lay out the letters as shown, and cut them out with a very sharp, pointed knife or razor blade. In doing this, be sure the connections are left in such letters as A, R, and P, otherwise the centers will fall out. On the side that is to be the front of the paper or cardboard, paste a sheet of red tissue paper, and before the paste dries, cut out the connecting pieces left in the letters above mentioned. The tissue paper will hold the centers of the letters in place. Tack the front in place with common carpet tacks.

5. If the sign is to be set in the front yard, make stakes and nail them to the sides of the box, leaving the ends of the stakes projecting slightly above the box to provide a means of driving them into the snow.

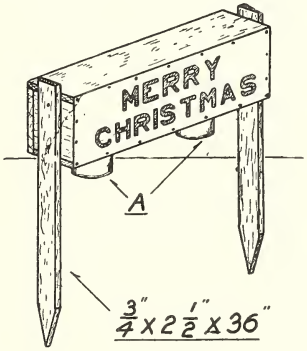
6. If desired, two fronts can be made, one Christmas greeting to be replaced by a New Year greeting.

7. Electric lights may be used in place of candles, in which case the matter is very simple. If candles are used, they should be held in place in the cans by permitting candle grease to drop in the center, and before hardening, setting the candles in place.

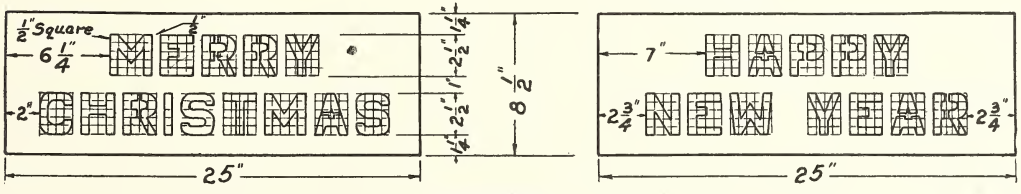
CHRISTMAS DECORATION



NOTE —
TIN CANS 4" DIAMETER, 3" DEEP



A - TIN CAN
B - CAN COVER
C - CANDLE
D - WIRE



SHOE-POLISHING STAND

The use of a stand of this kind will make it unnecessary for any boy to subject himself to criticism for getting polishing materials on the furniture, the bath tub, or other support where such things should not be.

Material

Wood and screws are the only materials necessary.

Construction

1. First, make the base, of a size to accommodate a larger or a smaller box, as desired.

2. Make the box next; assemble it with screws or brads, and fasten to the base, as shown.

3. The height of the upright piece may be made to suit your own liking. It may be of a height suitable for a sitting position or for a standing position while polishing. If made for use in a standing position, it probably will be well to have the foot support level instead of at an angle, as shown.

4. The construction of the foot rest is the most difficult part of the work. It may be made according to the pattern suggested in the drawing, which calls for two pieces of wood, each to be formed separately.

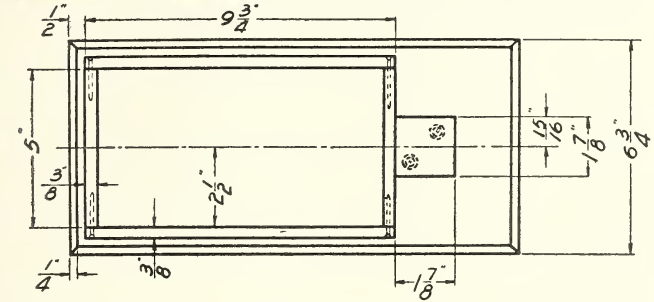
5. Make the brace next, to support the rest at a suitable angle.

6. Next, assemble the parts with screws.

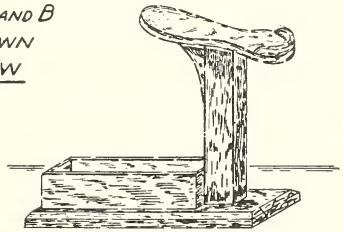
Finish

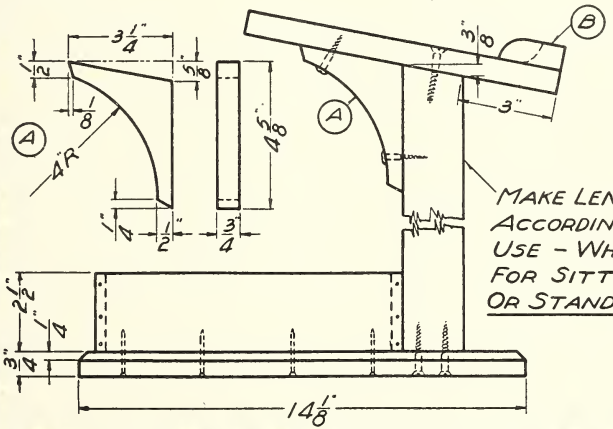
The finish will depend upon the wood used. If ordinary soft wood is used, or a wood without an interesting grain, the stand will look better painted. If wood like oak is used, the stand will look better if it is stained.

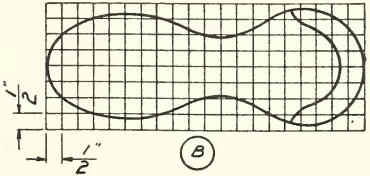
SHOE POLISHING STAND.

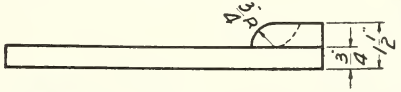


PARTS A AND B NOT SHOWN IN TOP VIEW









PAINT REMOVER

This most useful article will be particularly valuable around the home where much amateur painting is done. Only an expert can do a job of painting without getting paint on everything surrounding the surfaces worked over, and even his work often has to be followed up.

Material

Wood, screws, and a safety-razor blade are required.

Construction

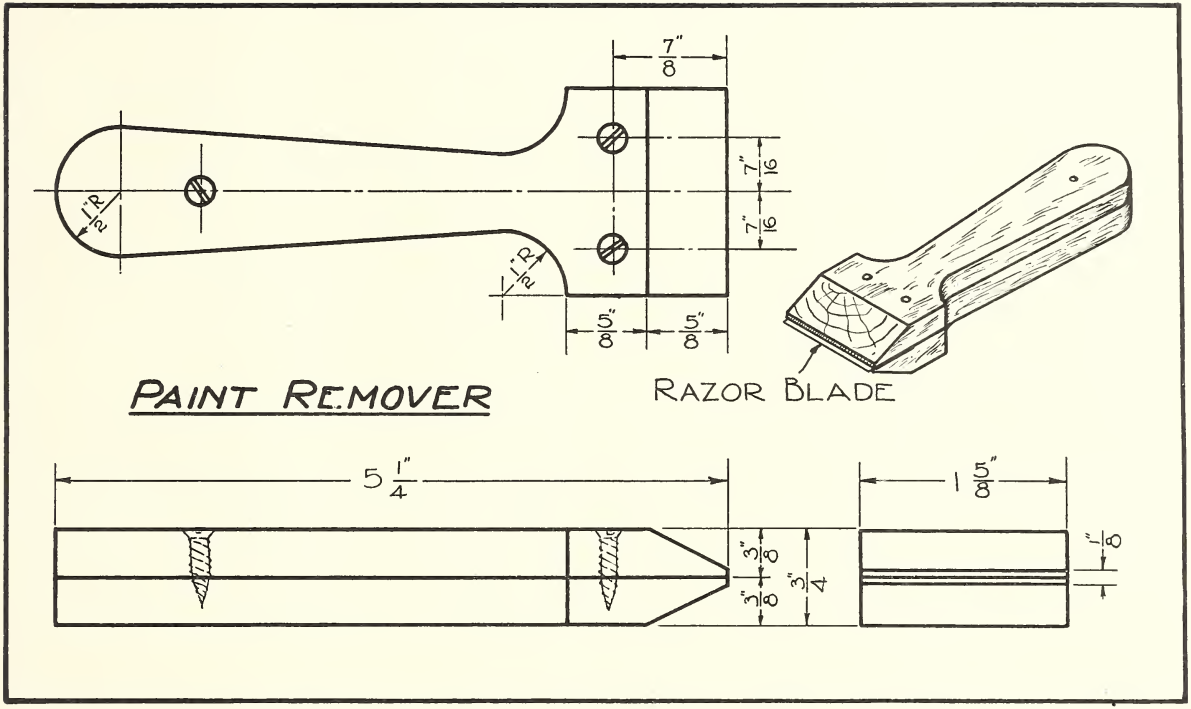
1. Make the handle of two pieces of either soft or hard wood. Lay it out and cut to shape with a coping saw, or a common jackknife if a saw is not at hand.

2. Make a shallow cut in each piece for the razor blade.

3. Locate and bore holes for the screws. Note that two screws must be inserted far enough from the front edges of the pieces so that the razor blade, when resting against them, will extend far enough to be usable. Razor blades vary in size and shape, so it may be necessary to change some of the dimensions to fit the particular blade available.

Finish

A finish is not necessary, but if desired, the pieces may be stained or oiled.


7/8"
7/16"
7/16"
1/2" R
1 1/2" R
5/8"
5/8"
PAINT REMOVER
RAZOR BLADE
5 1/4"
1 5/8"
3/8"
3/8"
3/4"
1/8"

BICYCLE FLAG HOLDER

The flag holder will be very useful and interesting to a boy with a bicycle on such days as Fourth of July and Armistice Day.

Material

Wood, screws, and flags as desired.

Construction

1. The blades of this windmill are cut differently from ordinary windmill blades; they are cut so that one turns to the right and the other to the left. Examine the drawing carefully, and be sure you understand it thoroughly before beginning to work.

2. First, cut part A to shape with a coping saw and backsaw.

3. Next make part B, after which cut the hole for the handle bar. To do this cutting, fasten both pieces in a vise, mark the location of the center on both sides, then bore halfway from each side. If your bit is slightly larger than the handle bar, a piece of leather may be placed beside the hole. If it is slightly smaller, no harm will be done. This is mentioned because the average boy has not a full set of bits from which to choose.

4. Small flags can be purchased at a novelty or a confectionery store. The size of the stick to which the flags are attached will determine the size of the holes to be bored in the holder, so the flags should be purchased first.

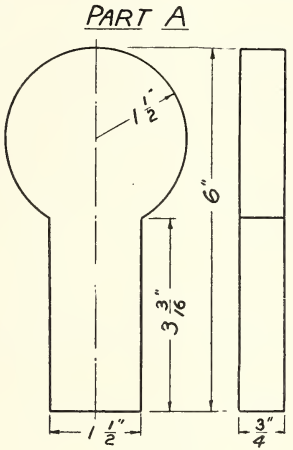
5. To assemble, place washers between the inside paddle and the holder and between the two paddles in order to insure their free operation. Use screws for the rest of the assembly.

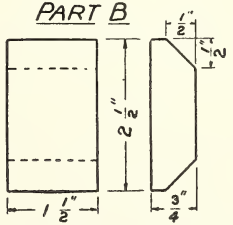
Finish

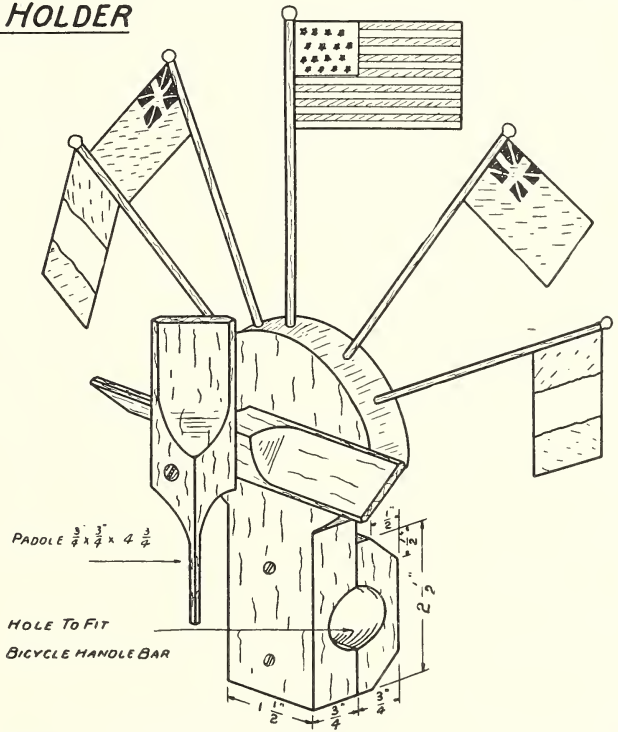
Paint the end of each paddle red, the center blue, and the rest of the paddle white. Revolving in opposite directions, a beautiful effect is produced by this color combination.

The holder proper may be painted with black or aluminum paint to match the handle bars.

BICYCLE FLAG HOLDER







WINDOW COLD BOX

An ice box is a necessity in summer, but in winter it may be dispensed with by using a device as shown here. The dimensions are taken from a box actually made, but they may be changed to suit any needs.

Material

A good grade of wood and screws are required.

Construction

1. When selecting stock, it is advisable to have one piece for the top, and one piece for each end, but the back and bottom may be made of several pieces, if necessary, allowing small spaces between the pieces for ventilation and cleaning. Get out the stock to the dimensions shown.

2. It may be that the arrangement of the shelves is not in accordance with some makers' ideas, but this may be changed to suit. As noted in the drawing, all dimensions are suggestive. The arrangement shown has proved very satisfactory, however.

3. In assembling, it is safer to use screws. By all means use screws for fastening the box in place in order that it may be easily removed for the summer.

4. Fasten a small block to the bottom as shown at X to offset the slant of the window sill.

5. A curtain is not necessary, but, if one is desired, a strip of cloth may be hung from the top, or a half curtain may be fastened to the inside of the window. The latter, of course, is the neater.

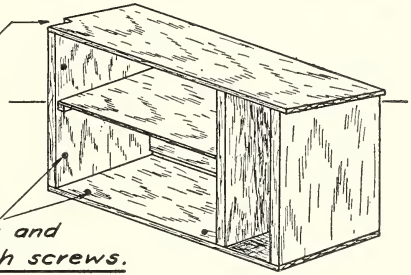
Finish

Both for appearance and durability, the box should have two or more good coats of paint. Dark green will look well, though it may be painted to match the house if it is a frame dwelling.

WINDOW COLD BOX

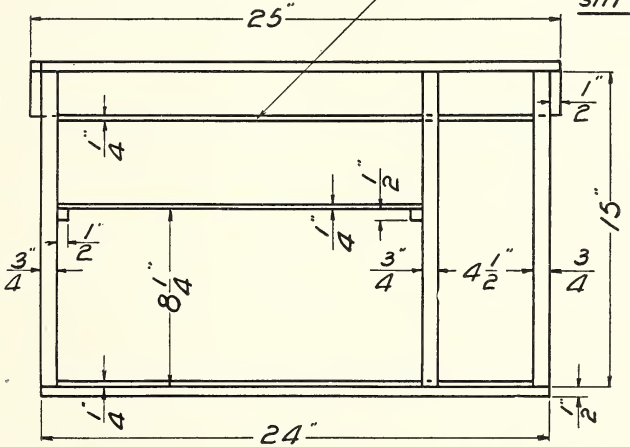
These dimensions are suggestive. Change to suit individual needs or conditions.

Cut to fit window

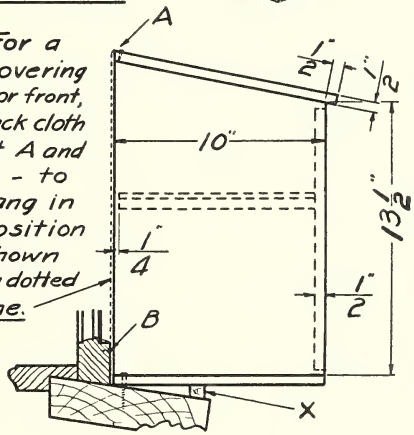


Fasten to stile and sill with screws.

For ventilation



For a covering for front, tack cloth at A and B, - to hang in position shown by dotted line.



JUMPING JACK

The interesting part of this toy, aside from its operation, is that it is not difficult to make or is the stock hard to obtain.

Material

Cigar-box material, pins, brads, and string are necessary.

Construction

1. First make the two uprights, which is a matter of very simple planing. Next make part E, and do the work accurately to insure a good fit when the parts are assembled. Cut the piece to the required over-all dimensions; then lay out and cut the ends. To do this, make several cuts with a backsaw to the required depth, removing the stock with a sharp jackknife if you have no small chisel. When this part is completed, test it with the uprights, and make necessary adjustments before proceeding with the rest of the work. The trouble with most work of this kind is that the fit is too loose. Oftentimes the accuracy of the work is determined by the difference between a dull and a sharp pencil.

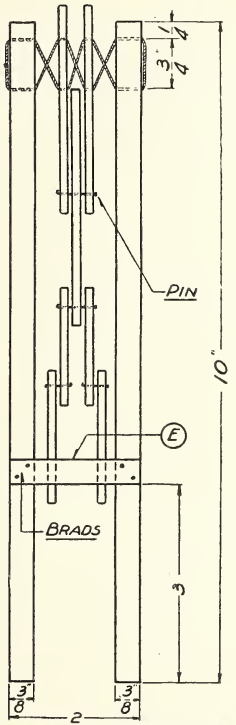
2. The patterns come next. Lay out the squares, and trace the outlines through them, cutting to shape with a coping saw.

3. Next, with a small bradawl, bore very small holes for the string and the pins. Sand all parts, and assemble for trial.

Finish

If the parts fit satisfactorily, take them apart for painting, using your own ideas as to colors.

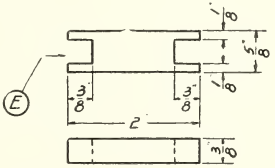
JUMPING JACK.

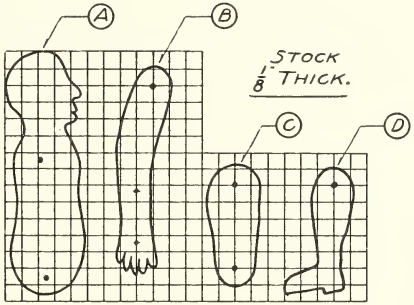


TWINE. BORE HOLES FOR SAME IN UPRIGHTS AS SHOWN, AND AT POINTS MARKED • ON PARTS B.

AT POINTS MARKED • ON PARTS A B C D BORE HOLES FOR PINS.

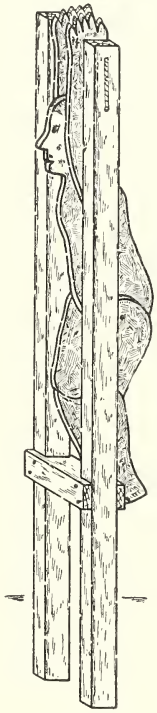
DECORATE PARTS TO SUIT.





STOCK 1/8" THICK.

TO LAY OUT PATTERNS, DIVIDE INTO 1/4" SQUARES AND TRACE AS SHOWN. MAKE ONE OF A, TWO OF B, TWO OF C AND TWO OF D.



AUTO TRUCK

As shown in the drawing, the box on the truck is not movable. It is suggested that after the truck is completed, an experiment be conducted to try and devise a scheme whereby the truck can be made to dump its contents. Several problems will be confronted. The box must be set on the truck frame or platform so that when the box is tilted, the contents will fall out, and it must be hinged at some point to permit raising and lowering. Some arrangement must be devised to hold the front of the box in place when in its natural position. Try your skill at this.

Material

Wood, screws, washers, and a screw eye are required.

Construction

1. Make the box first. Be sure that the ends of the pieces are perfectly square, and fasten them together with brads.

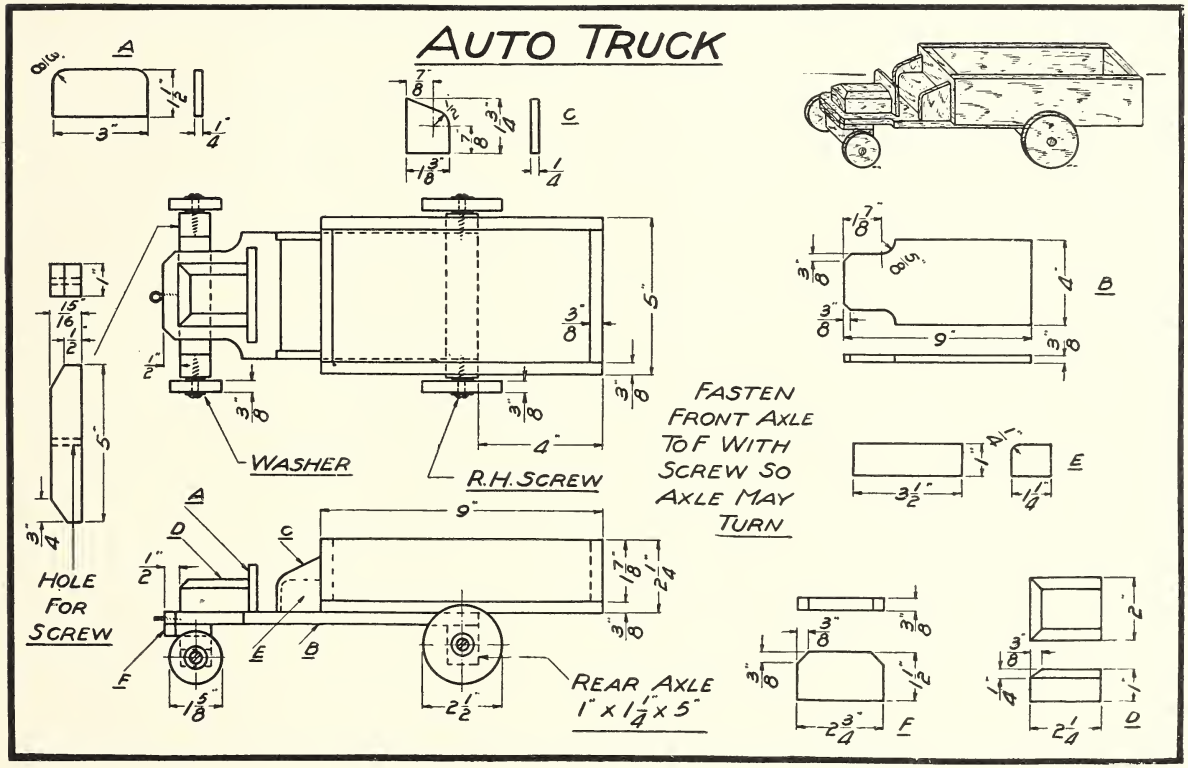
2. The wheels must be perfectly round if the truck is to operate smoothly. Use a pair of sharp steel dividers for laying out the circles, scribing rather deeply to get a good line to work to. Cut them to shape with a coping saw, leaving just enough stock for finishing with a wood file. Bore holes at the center of each wheel large enough to permit easy turning on the screws used to hold them to the axle.

3. The other parts need not be made in any particular order, and none are difficult.

4. Assemble the parts with brads and screws, and be sure to use washers when assembling the wheels. The assembly drawing at the left and the picture drawing in the upper right-hand corner contain all necessary information concerning the relation of the various parts to each other.

Finish

The truck should be painted, but no painting scheme is given. Study some of the trucks you see about the streets and select a color combination. Do not use too many colors, because the fewer you use, the easier the work will be.


AUTO TRUCK
A
3"
1 1/2"
1/4"
C
7/8"
1 1/4"
3/8"
1 3/8"
1/4"
B
7/8"
3/8"
4"
9"
3/8"
3/8"
5"
3/8"
3/8"
4"
WASHER
R.H. SCREW
FASTEN FRONT AXLE TO F WITH SCREW SO AXLE MAY TURN
E
1"
1/4"
3 1/2"
15/16"
1/2"
5"
3/4"
HOLE FOR SCREW
A
D
C
9"
1/2"
1 7/8"
2 1/4"
3/8"
F
E
B
1 5/8"
2 1/2"
REAR AXLE 1" x 1 1/4" x 5"
3/8"
3/8"
1 1/2"
2 3/4"
F
2"
3/8"
1/4"
1"
2 1/4"
D

SEWING CABINET

Most sewing cabinets are made with many drawers, and the parts are joined with mortise-and-tenon joints, making rather a difficult problem for the average boy. The cabinet shown in this drawing involves mostly straight planing and will be just as satisfactory as the more elaborate kind.

Material

Use a good soft wood like gumwood or poplar in its construction. Walnut or mahogany can be worked up well in most cases, but oak is too hard and should not be used. Screws and hinges also will be needed.

Construction

1. Get out the stock for the end pieces, and lay out the design by means of squares as illustrated in the drawing. Cut the upper part of the pieces to shape with a ripsaw and a crosscut saw, finishing with a plane. Cut the design with a coping saw or a turning saw.

2. Next, make the sides, but do not plane the angle at the upper edge until fastened to the end pieces.

3. Locate and drill holes for the screws which fasten the ends and sides together; then assemble.

4. Fit the bottom between the sides with care, and saw it to length before planing the bevels on the edges. Insert the piece for the bottom from the top when fitting, test it often, and take but a few shavings off at a time to make sure there are no cracks through which pins and needles might fall.

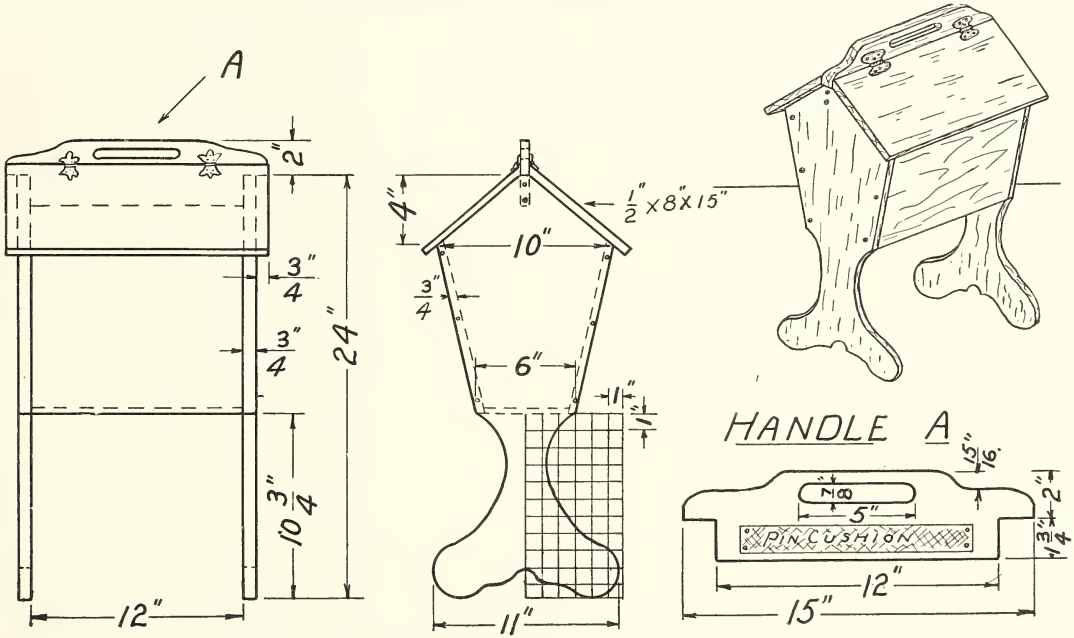
5. Work out the handle hole in the handle with a ⅞-in. bit and a chisel. Glue a piece of velvet to a strip of cardboard covered with cotton to make a pad, and tack it to the handle for use as a cushion for pins and needles.

6. Make the covers of well-seasoned material so that they will not warp. Fit them in place and fasten to the handle with brass hinges, but be sure all pieces are well sanded.

Finish

Stain to suit; then apply several thin coats of shellac, rubbing each coat with a piece of fine sandpaper.

SEWING CABINET



WOOD PINCERS

For the boy who likes to whittle, this problem will be a good test of his skill in using the knife and in following directions. These pincers will be found especially useful to the boy who is interested in photography and who does his own developing, where a pair of tongs is a convenience. The developing chemicals would affect metal tongs, but not those made of wood.

Material

A piece of straight-grained soft wood is necessary. White pine is preferred.

Construction

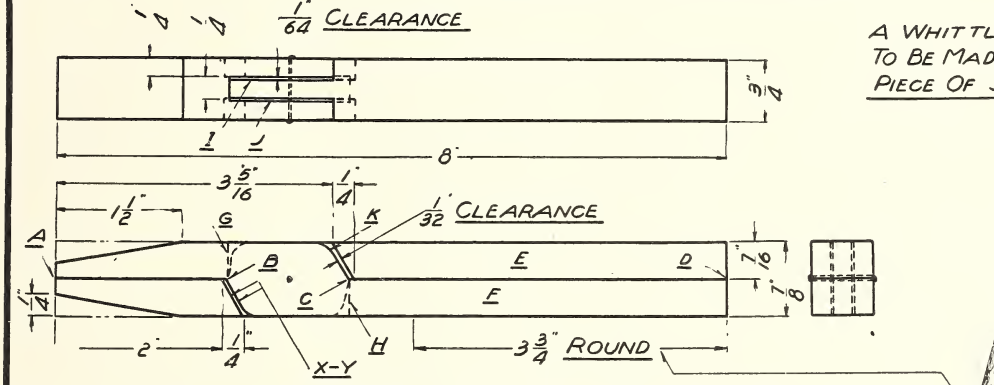
1. Reduce the piece to the over-all dimensions; then lay out the outline of the tongs on the wood with a very sharp-pointed pencil. Make the layout on all four sides, the outline being the same on the top and bottom and the same on the two sides.

2. With a sharp, thin-bladed knife, cut from A to B and from C to D, working very carefully and from opposite sides. Continue until the two cuts meet. Next cut ¼ in. deep on all lines corresponding to XY, and working from opposite sides. Allow clearance as shown, and carefully round all corners corresponding to K.

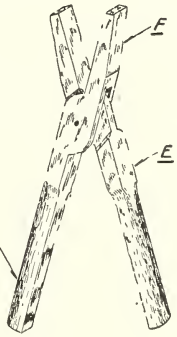
3. Next, begin cutting on lines I and J, working from opposite sides and cutting clear through. The reason for these various cuts should now be quite clear, and the work will proceed with a better understanding on your part. Continue cutting until part E is separated from part F, that is, so they will operate like a pair of tongs. Some trimming and smoothing will be necessary before the tongs will operate properly. Round the upper parts of the handles to suit. If longer handles are desired, make the original piece of stock longer.

4. Put a pin or a brad through the jaws to hold them in position.

WOODEN PINCERS.



A WHITTLING PROBLEM. TO BE MADE FROM ONE PIECE OF STOCK.



MATERIAL — STRAIGHT GRAINED SOFT WOOD, 3/4" x 7/8" x 8".

FIRST:- LAY OUT CAREFULLY WITH SHARP PENCIL ON ALL FOUR SIDES. NEXT:- WITH A SHARP, THIN BLADED KNIFE, CUT FROM A TO B AND FROM C TO D, WORKING FROM OPPOSITE SIDES AND CUTTING CLEAR THROUGH. NEXT:- CUT ON ALL LINES CORRESPONDING TO X-Y, ON OPPOSITE SIDES, 1/4" DEEP. NEXT:- CUT ON I AND J, WORKING CLEAR THROUGH FROM OPPOSITE SIDES. NOTE BY LINES G AND H, THAT A SLOT WILL BE FORMED IN PART F, WITH ENDS AT RIGHT ANGLES TO UPPER AND LOWER SURFACES. WHEN THE PARTS ARE SEPARATED, SMOOTH SO THEY WILL WORK EASILY ROUNDING CORNERS AT K AND ALLOWING CLEARANCE AS SHOWN. PUT PIN OR BRAD THROUGH JAWS.

PENCIL BOX

This box will be found very useful in caring for the various small pieces of school equipment for which every boy and girl is responsible.

Material

Soft wood, brads, a small hook, and brass or tin for the hinges are required.

Construction

1. All the joints are of the butt variety, hence the pieces must be carefully squared up. A number of pieces may be combined in planing, reducing the amount of work somewhat.

2. Begin assembling by fastening the side pieces to the ends. Even though the ends are all perfectly square, it will be necessary to see that the parts are properly related to each other.

3. Next fasten the bottom in place. The fit of this piece will test the accuracy of your work, for it should be neither too narrow nor too wide.

4. Fasten the partitions in place next, but be sure that they are square with the bottom.

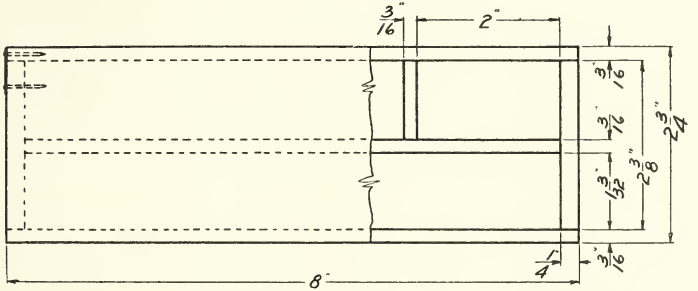
5. Test the fit of the cover, making any adjustment necessary. Make the hinges from the small pieces of tin or brass, cutting both hinges from one piece of material ¾ in. square. Round off the sharp edges and punch holes, just large enough for the brads to enter. When complete, attach to the box as shown in the drawing.

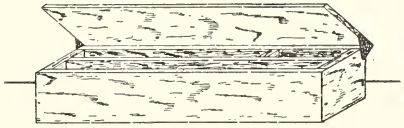
6. A small hook, necessary to hold down the top, may be made from a piece of brass, if desired, or it may be purchased in a hardware store.

Finish

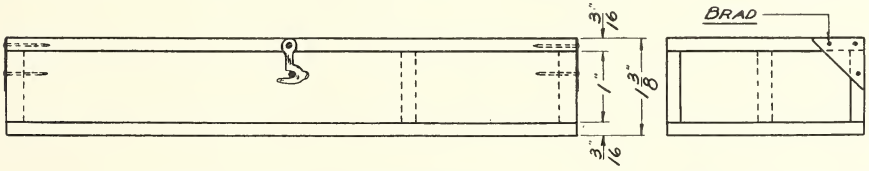
Even though the wood used is soft, it can and should be stained. Above all things, the surface should be very smooth. Apply the stain lightly and rub off at once. It may be well to stain only the outside of the box, applying a coat of shellac to the inside, and a thin coat of it over the stained surface.

PENCIL BOX.

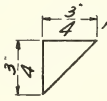




TOP IS HELD IN PLACE BY SMALL HOOK SHOWN IN FRONT VIEW.



MATERIAL - ANY GOOD SOFT WOOD
ASSEMBLE WITH BRADS



HINGE - MAKE TWO FROM THIN BRASS OR TIN

PUNCH HOLES FOR BRADS.
BREAK SHARP CORNERS.

MOTOR TRUCK

This is a good example of a "workable" toy. It is sure to please any youngster who is fortunate enough to have it.

Material

For this work, wood, tin, wire, and rubber bands will be needed.

Construction

1. The drawings of parts A and B are clear and simple and should present no difficulties.

2. Carefully make the little wooden bead C, which holds the propeller blade away from the propeller stand. Round one end to rest against part E, and drill a hole very carefully through the length of the head. This hole should be large enough to permit the propeller shaft D to fit loosely.

3. Part D, which holds the blades of the propeller, is of wood. Study the diagram carefully and be sure that it is made properly. Make a fine saw cut in each end of the holder to receive the tin propeller blades, and use small brads for fastening the blades.

4. Make the notch in E so that the part will fit snugly on the front end of the truck body. Drill a small slanting hole through this part to receive the propeller shaft G. This hole must be large enough, however, to allow the propeller shaft to turn freely.

5. Tin is used for parts F, of which there are two, used as braces for the axles.

6. The propeller shaft G is made of wire. Fasten the shaft securely to the propeller by bending over the end of the wire, then forcing it into the wood, as shown in the diagram in the lower left-hand corner.

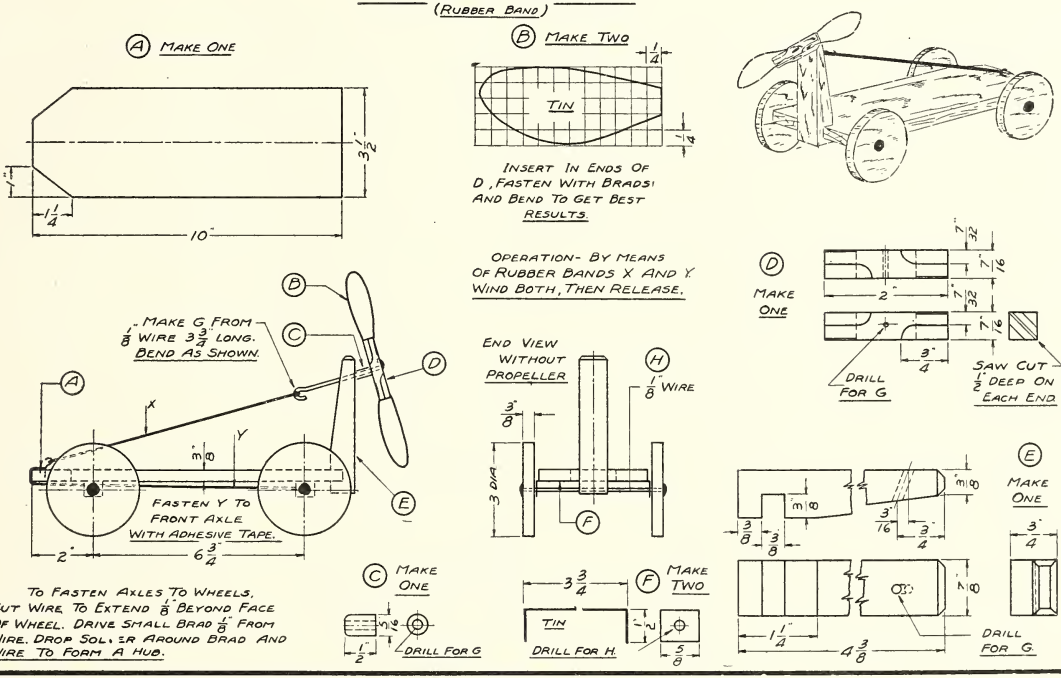
7. Be sure the wheels are round and that the holes for the axles are bored at right angles to the face of the wheels. Fasten the wheels to the axles in the manner described in the lower left-hand corner of the drawing.

8. The motive power is furnished by rubber bands located as shown.

To operate the toy, wind both the propeller and the two front wheels, winding the wheels backward. This causes the rubber band to wrap around the axle and become stretched. When the wheels are released, the band unwinds, thus revolving the wheels, and sending the truck forward. Release the wheels and the propeller at the same time.

MOTOR TRUCK.

(RUBBER BAND)



WINDOW SCREEN

A wide variety of joints may be used in making an article of this kind, but for the amateur, the construction of the butt joint will be found the easiest. If the nails are well set and the fasteners properly driven, this screen will be found to be very rigid after the wire cloth is tacked to the frame.

Material

The wooden frame should be cypress or white pine. The necessary hardware is shown in the drawing.

Construction

1. First determine the dimensions A and B. Decide what lengths of stock will cut to the best advantage, and order your material accordingly. If the screen is over 4 ft. in length, fasten a crosspiece in the center to strengthen it.

2. Cut your pieces to the necessary lengths, using a miter box for this work, if possible.

3. Fasten the frame together with 8-penny finishing nails, set well into the sides. Nail the bottom piece about ⅛ in. from the ends of the side pieces, to allow the water to run off should the rain beat through the screen. Complete the fastening by driving ½-in. corrugated fasteners into place as indicated in the drawing.

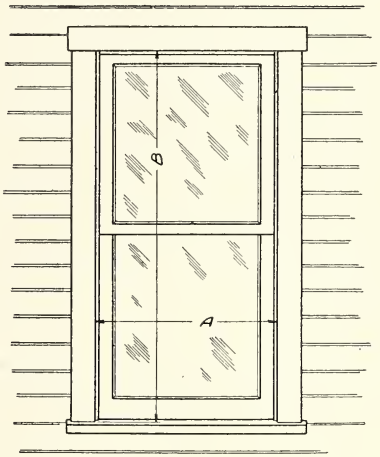
4. Before stretching the wire cloth in place, give the frame two coats of paint.

5. Tack the wire cloth in place with 4-oz. tacks. Fasten one side and one end, then the other side and end, using a pair of pliers to stretch the cloth. Finish the frame by covering the edge of the cloth with clover-leaf molding, mitered at the corners and fastened with 1-in. brads.

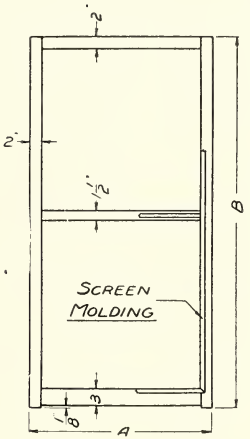
6. The simplest way to fasten the screen in place is to drive finishing nails through the screen frame into the window frame, allowing enough of the nail to protrude to be easily withdrawn.

7. The most satisfactory way of fastening is to have hangers attached at the top to the outside of the window and screen frame. This will permit the screen to be removed very easily by pushing out and raising up from the bottom. Use a short gate hook and eye to fasten the screen at the bottom.

WINDOW SCREEN

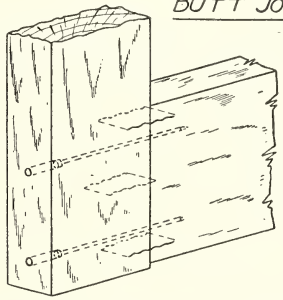


WINDOW ELEVATION



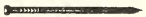
SCREEN FRAME

BUTT JOINT



MATERIAL - CYPRESS, WIRE CLOTH, MOLDING AND HARDWARE AS INDICATED

HARDWARE



8 d FINISHING NAIL

HANGERS

DOOR BUTTONS

CORNER BRACKET

CORRUGATED FASTENERS

GATE HOOK AND EYE

WATCH HOLDER

It is said that a watch should always occupy an upright position, but usually at night it is just laid on the dresser with no thought as to its care. This holder will not only keep the watch in an upright position, but will permit one readily to see the time from a distance.

Material

Wood, such as walnut, mahogany, etc., screws, and a cup hook are required.

Construction

1. Begin with the base which is very simple. The drawing shows the uprights fastened with screws, but a mortise-and-tenon joint may be used if desired.

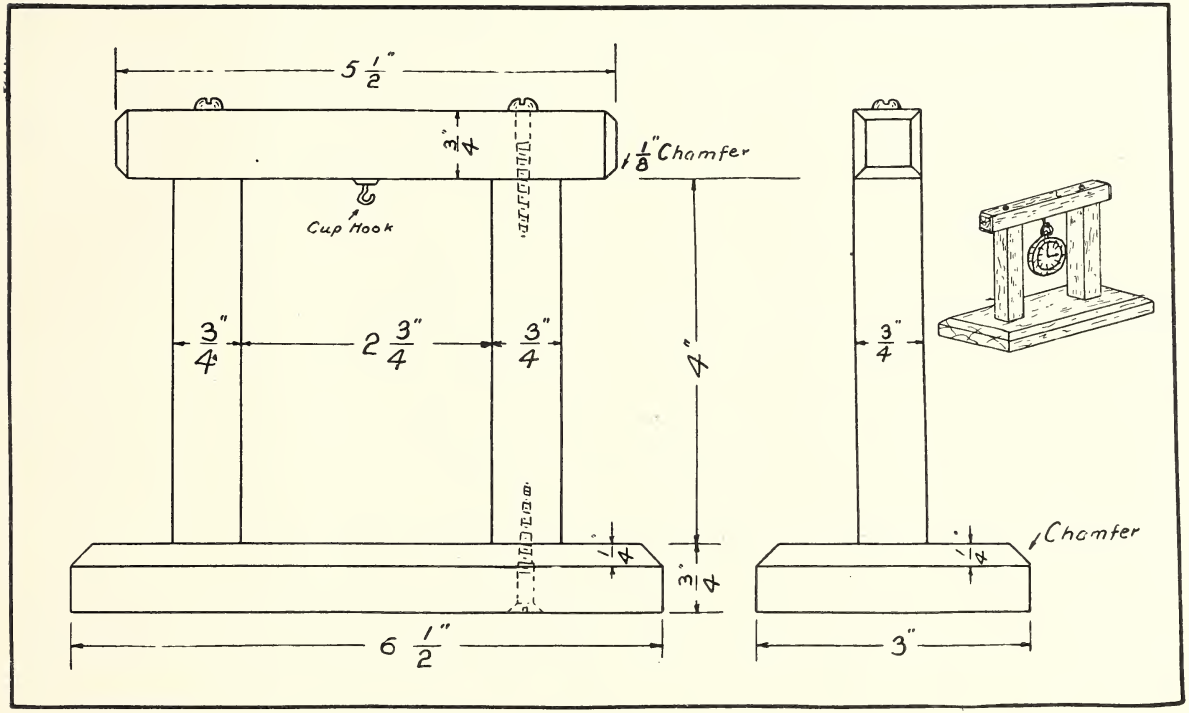
2. Lay out the uprights and the crosspiece in one piece of stock; then cut to the desired lengths. This method will save time in preparing these pieces.

3. The base and the crosspiece are fastened to the uprights with screws, so the next step is to locate the center on each end of the upright pieces by means of diagonal lines. At the center, drill holes for the screws, the holes to be the size of the screws at the bottom of the thread. The holes through the base and the top crosspiece should be slightly larger than the screws measured just below their heads. The size of the screws should be about 1½-in. No. 10.

4. Before assembling, sandpaper all pieces well and fasten the cup hook in place in the center and lower side of the crosspiece.

Finish

The piece may be painted, lacquered, or stained as desired.


5 1/2"
3/4"
1/8" Chamfer
Cup Hook
3/4"
2 3/4"
3/4"
4"
1/4"
3/4"
6 1/2"
3/4"
1/4" Chamfer
3"

SAIL BOAT

Boats are attractive to boys of all ages. This one was made by a small boy, to sail in the park, and it looked so attractive that other boys wanted to make one like it.

Material

Pine, brads, and tin are necessary.

Construction

1. Begin construction with the hull, planing it to overall dimensions. Saw the groove for the keel before forming the hull, and remove the stock from the inside while the hull is still square. Remove most of the stock with a gouge, finishing with a chisel.

2. Lay out and cut the shape of the stern next; then form the hull. To insure both sides of the hull being alike, make a pattern for each curve and work carefully to it. Use the same pattern for each side; the patterns can be easily reversed. Use a plane for working lengthwise of the hull and a spokeshave for forming the bow and the stern. Remember, however, that with the spokeshave only a small amount of stock should be removed with each cut.

3. Bore the hole for the rudder post next, but be very careful to make the hole parallel with the slanting part of the stern.

4. Make the piece for the small cabin, and bore holes for the mast and the jib which will be bradded in place.

5. When making the mast, the grooves may be cut very carefully with a knife.

6. Saw a slot in the rudder post, being careful not to split it. Make the rudder of tin, and fasten it with brads. Drive a small brad through the post close to the deck to keep the rudder from slipping down.

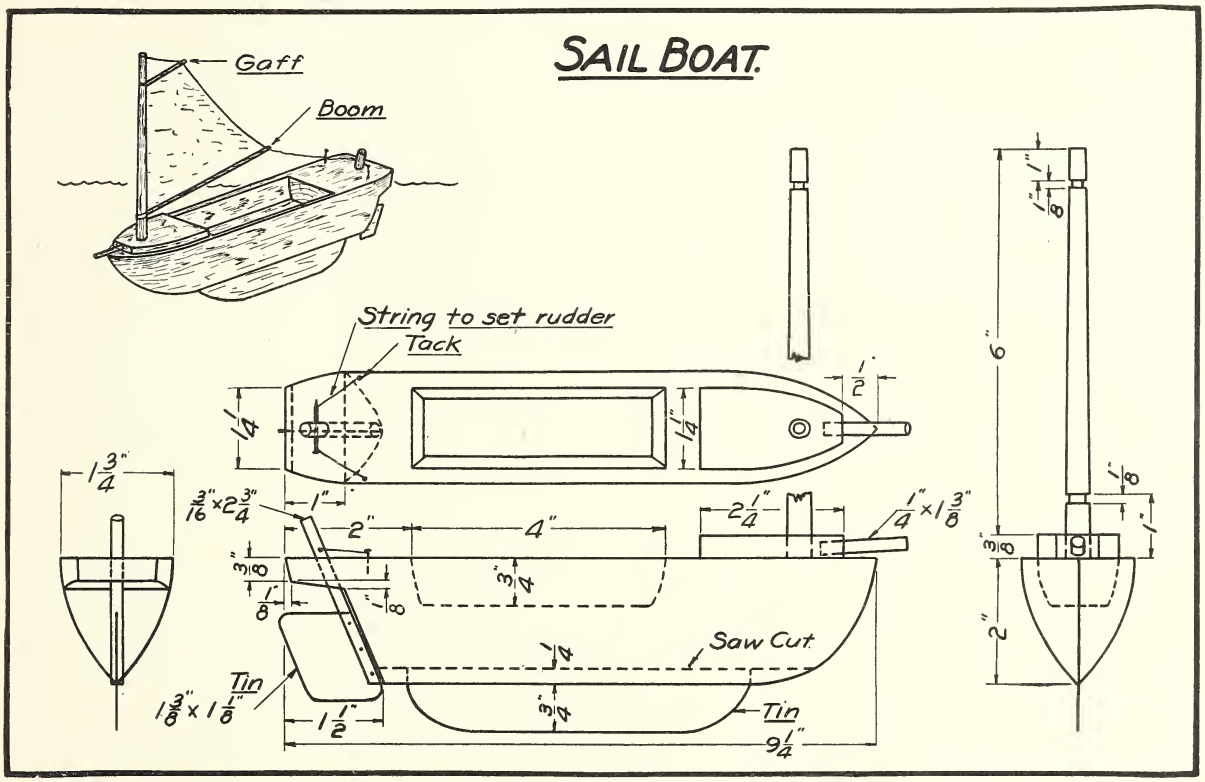
7. Cut the tin keel next, bending the edge over $\frac{1}{4}$ in. to make it thick enough to fit snugly into the groove.

8. Make the boom $5\frac{1}{2}$ in. long and the gaff $2\frac{1}{2}$ in. long. They are held to the mast by small strips of tin $\frac{1}{8}$ in. wide, long enough to go around the mast, and far enough back on the boom and gaff to be bound with string. The fit should be just loose enough to allow free play in the grooves in the mast. Fasten a string from the top of the mast to the end of the gaff, and another from the end of the boom to a small brad driven in the deck. Cut the sail to fit this space, and bind it to the gaff and boom.

Finish

The boat should be painted both from the standpoint of appearance and protection. The action of the water on the unprotected wood hull would soon harm it.

SAIL BOAT.


Gaff
Boom
String to set rudder
Tack
1/4
1/4"
1/2"
1 3/4"
3/16"x2 3/4"
1"
2"
4"
2 1/4"
1/4"x1 3/8"
3/8"
1/8"
3/4"
1/4
Saw Cut
Tin
1 3/8"x1 1/8"
1 1/2"
Tin
9 1/4"
1/8"
6"
1"
3/8"
2"

DOLL HOUSE

Plate 1

At first glance this problem may seem difficult, inasmuch as a number of parts are to be made. However, a careful study of the drawing will show that the house is not hard to make.

Material

1. For the roof, sides, partitions, and dormer, wall board, which can be purchased at a lumber yard, is preferable. If unable to obtain this, material from large packing cartons will do.

2. For the chimney, the upper and lower frames of the house, B and C, the front porch post and railings, and the front and rear stairs, wood should be used.

3. Isinglass may be used for the windowpanes, fastened over the window openings with strips of paper glued on the inside of the house. The small divisions of the windowpanes may be made by gluing small strips of paper over the panes.

Construction

1. Cut wall board with a crosscut saw. Do not attempt to do the work with a knife.

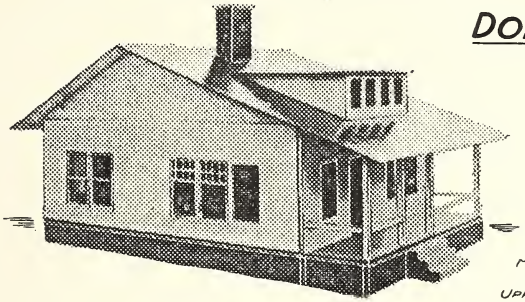
2. From information obtained by studying the drawing, construct the chimney, the dormer, the front porch, and front stair.

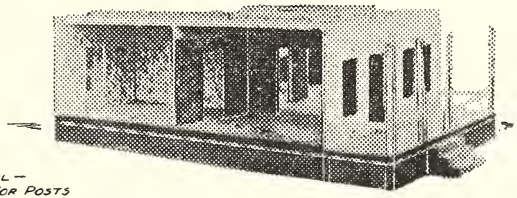
3. Cut the front, rear, and sides of the house from the wall board.

4. Next, lay out and cut the door and window openings in the front and the right side of the house. These are the only elevations shown in this drawing. The balance of the information is given in Plate 2.

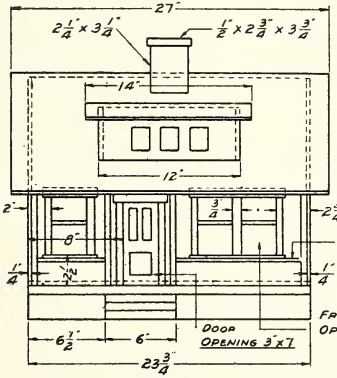
DOLL HOUSE.

PLATE 1

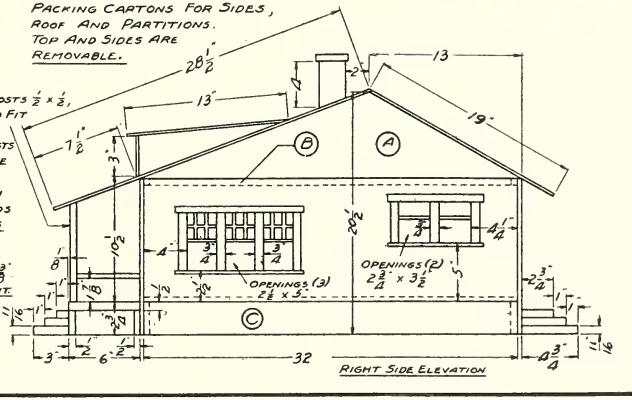




MATERIAL —
WOOD FOR POSTS
UPPER AND LOWER FRAMES, ETC.
WALL BOARD OR MATERIAL FROM
PACKING CARTONS FOR SIDES,
ROOF AND PARTITIONS.
TOP AND SIDES ARE
REMOVABLE.



PORCH POSTS 1/2" x 1/2", LENGTH TO FIT SET TWO INNER POSTS SO OUTSIDE SURFACES ARE EVEN WITH ENDS OF STEPS



RIGHT SIDE ELEVATION

DOLL HOUSE

Plate 2

Construction

1. From information given in this plate, prepare the rear and left sides of the house, and cut the door and window openings.

2. In the interior plan, the location of partitions and doors is shown. The partition crosswise of the house is placed so the dining and living rooms, in the front, are both 16 in. deep. The bedroom and kitchen take up the other space. The lengthwise partition is in the center of the house.

3. Detail A shows the gables of the house which are held together with strips of wood.

4. The upper frame, supporting the ceiling, is shown in detail B. Detail C, the bottom frame of the house, is exactly 24¾ in. wide. This is the outside width of the house. The right and left sides of the house are set so they are flush with the sides of frame C. As the sides rest against and on the outside of frame B, this frame must be made the width of frame C, less the thickness of the two pieces of wall board used for the sides of the house. Both sides of the house are removable, which is the reason for the difference in the sizes of frames B and C.

5. The floor of the house does not extend to the edge of frame C. Instead, it is cut to extend just enough inside the edge to allow the side pieces to fit into place, flush with the outside edge of the frame. How this is done is shown in a small corner section of the rear elevation.

6. The front and rear pieces of the house extend to the bottom of the frame, which gives the house the necessary strength to hold together.

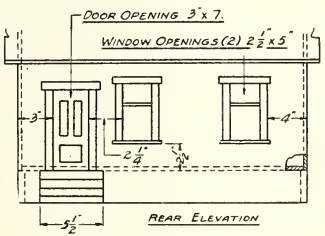
7. A small porch swing may be made from the end of a pasteboard box, cut to the dimensions given in the small diagram of the swing. Porch boxes for flowers may be made from strong paper or cardboard.

Finish

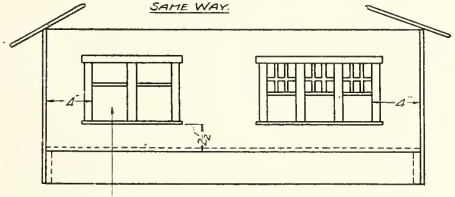
1. The inside of the doll house may be finished to suit your own taste. It adds greatly to the appearance of the house to have all the rooms neatly papered.

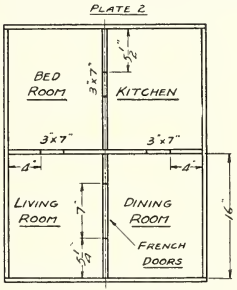
2. Paint the sides of the house to represent brick, if you wish. If the sides are of brick, the gables should be painted to represent wood.

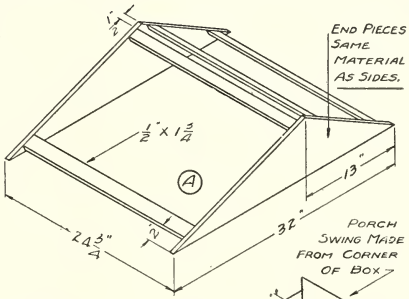
DOLL HOUSE.

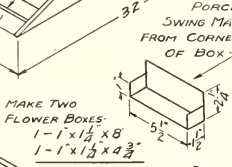


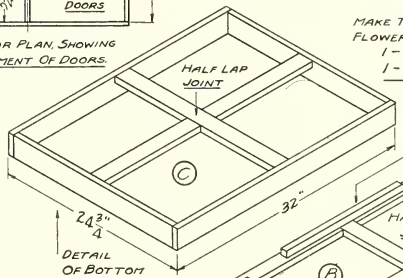
WINDOWS ARE MADE FROM MATERIALS USED IN WINDOWS OF AUTO CURTAINS. WINDOW FRAMES, ETC, MADE BY PASTING PAPER OVER WINDOWS, THUS HOLDING LATTER IN PLACE. DOOR FRAMES AND PANELS ARE MADE THE SAME WAY.





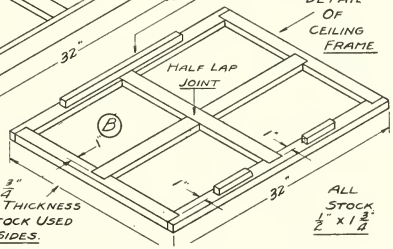






½" x ½" x 18" TO HOLD A IN PLACE.

DETAIL OF CEILING FRAME



PAINT SIDES OF C TO REPRESENT BRICK, ALSO REAR OF HOUSE TO SAME HEIGHT.

LEMONADE STAND

The ambitious boy who wishes to sell lemonade, etc., in the summer, will find this stand very useful. It is not difficult to make, and most of the material can be found around the house.

Material

An old packing case, wood for the frame, roof, seat, and shelves, casters, and screws, are necessary.

Construction

1. The packing case should be as near 2 ft. deep and 3 ft. square as possible. Take off the top and pull out the nails which may remain around the top edge.

2. Place the four casters near the corners of the box. Casters which are fastened in place with screws will be the most satisfactory for this work.

3. Get out the upright pieces for the four corners. These should be about 5 ft. long, fastened to the inside of the box with nails. Make and fasten to the upper ends of the corner pieces a frame constructed as shown in the upper left-hand corner of the drawing.

4. Make the rafters of thin lumber. Nail the roof boards in place, and cover with an old curtain or piece of canvas. Drop curtains for the sides may be made from discarded window curtains.

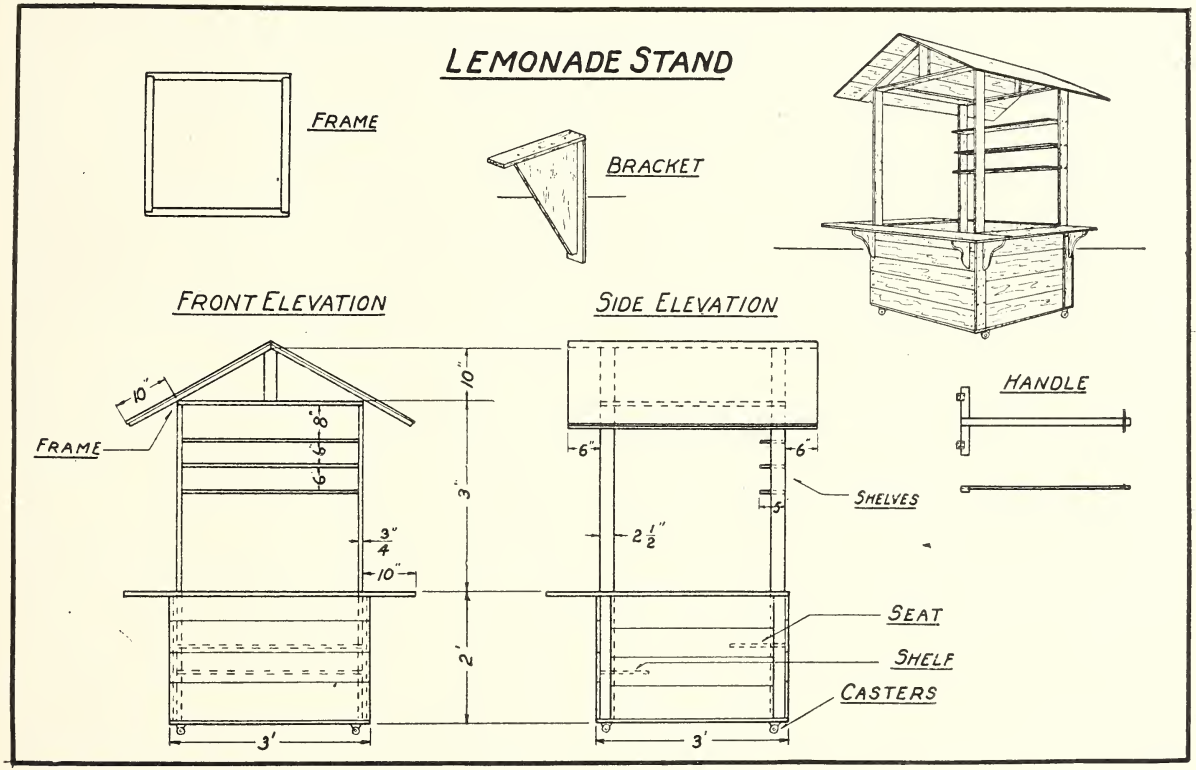
5. Make the braces or brackets for the counters either straight or curved. Fasten the counters in place with nails. If the front counter is allowed to project inside of the box, a money drawer may be made and attached to the underside of it.

Finish

The stand should be attractive; therefore it should be given a coat of paint. If this should seem too expensive, however, it may be dispensed with.

Use

By attaching a handle as suggested in the drawing, the stand may be moved from place to place. Signs indicating the price of the goods offered for sale will be an advantage. These can be made by the builder of the stand.


LEMONADE STAND
FRAME
BRACKET
FRONT ELEVATION
SIDE ELEVATION
HANDLE
FRAME
10"
8"
6"
6"
3"
4
10"
3'
10"
2'
3'
6"
6"
5"
2 1/2"
SHELVES
SEAT
SHELF
CASTERS
3'

HAND SLED AND CHILD'S SEAT ATTACHMENT

This sled is adapted to several purposes. By fitting to it a detachable box and seat, it may be used as a sleigh for the baby, or for hauling groceries and other material. With the box removed, it may be used for coasting.

Material

For the runners, use hard wood, and for the balance of the sled, a soft wood will do. Metal for the shoes may be flat, oval, half round or round, and wooden braces or metal angle irons may be used for bracing.

Construction

1. Make the runners first. Lay them out according to the drawing, shaping with a saw and plane. Lay out and cut the notches for the spreaders and the hand holds.

2. Two spreaders are necessary. Use 2-in. screws to fasten them to the runners, remembering that you must bore holes of the proper size for them, and that the screws must be countersunk.

3. For bracing the runners, use either wooden braces or metal angle irons. The drawing shows the size of the wooden braces.

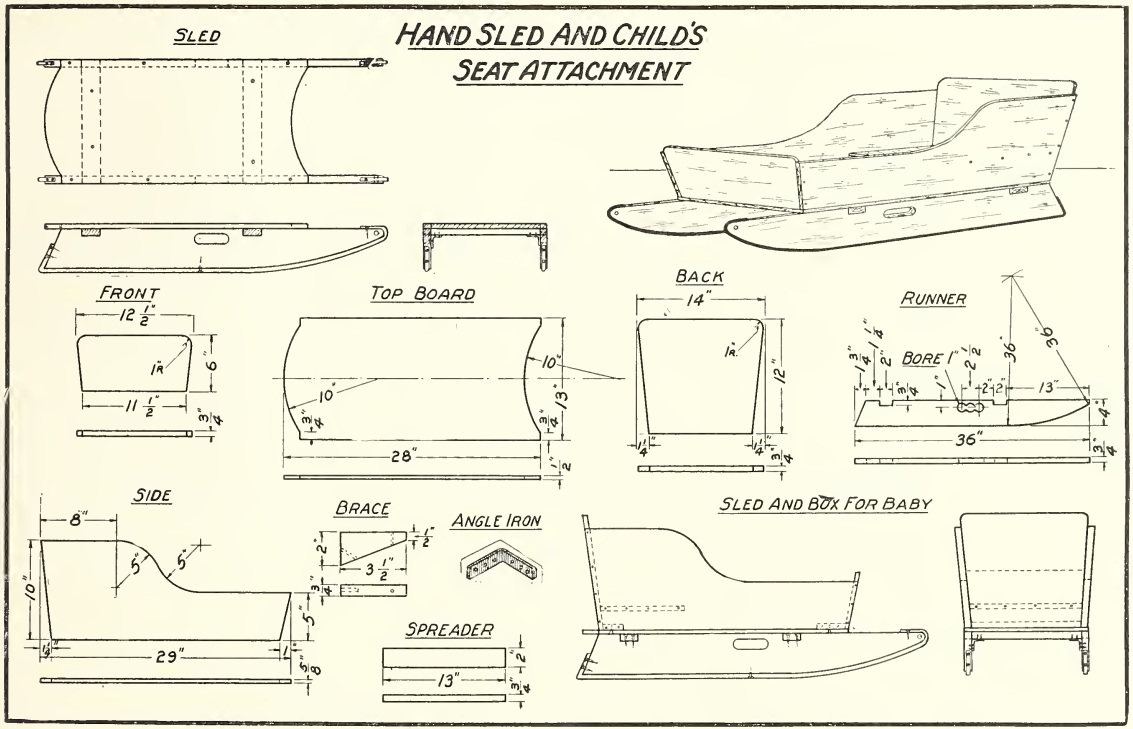
4. The top of the sled requires a wide board. If one of the necessary width cannot be obtained, glue two pieces together, and reënforce them with corrugated fasteners. Fasten the top to the spreaders with screws.

5. The shoes, as indicated above, may be made of different-shaped pieces of iron. If round iron is used, it will be necessary to make a groove in the runners to hold it in place. Use a gouge to make the groove. Heat the metal shoes and bend to fit the runners. If you have difficulty in doing the work, or do not have the facilities, take the parts to a blacksmith. He can do it quickly at a small cost.

6. The seat attachment is very easy to make and requires no explanation. Fasten the box together with nails and glue, or screws. The best way to fasten this attachment to the sled is by means of short bolts and wing nuts.

Finish

Sandpaper the parts well, and paint the sled red and the box white, or vary it to suit your own taste.


HAND SLED AND CHILD'S SEAT ATTACHMENT
SLED
FRONT
TOP BOARD
BACK
RUNNER
SIDE
BRACE
ANGLE IRON
SPREADER
SLED AND BOX FOR BABY

ASH SIFTER

Many people waste a great deal of fuel by carelessly shaking the furnace or by using fuel too small for the grates. With the sifter shown, much fuel can be saved that would otherwise find its way into the ash heap. Moreover, it will provide an easy means of securing fine ashes to spread on the slippery sidewalk.

Material

1. For the frame, three pieces of ¾-in. pipe, each 5 ft. long, and two ¾-in. elbows are needed. Two of the 5-ft. pieces must be threaded on one end and one piece must be threaded on both ends.
2. The sides and ends of the sifter box are made of wood, and the bottom is made of hardware cloth.
3. Telephone wire will be needed to suspend the box in the frame.

Construction

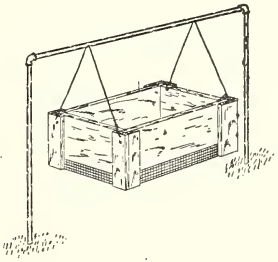
1. In the piece of pipe forming the top of the frame, drill two ⅛-in. holes 30 in. apart, and equidistant from each end; then turn the parts into the two ¾-in. elbows.
2. Dig two holes 12 in. deep and 5 feet apart. Place the two uprights in these holes, fill the holes with cement, and let set for 24 hours.
3. While the cement is hardening, make the sifter box of ¾-in. stock. Cover the bottom with the hardware cloth, letting it extend up on the sides about 3 in.; then nail the corner strips in place.
4. In the ends of the box, drill holes to receive the telephone wire used to support the box from the frame. Adjust the wire to permit the box to hang at the desired height.
5. It has been taken for granted that this sifter would be used in the back yard, but if it is desired to place it in the basement, it will not be necessary to make the iron frame. Simply fasten screw eyes in a joist at the proper distance apart and run the wire through them.

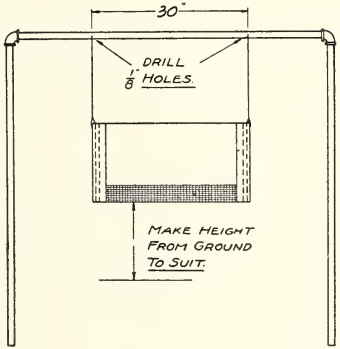
ASH SIFTER.

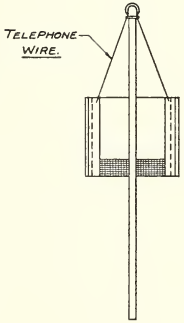
MATERIAL - $\frac{3}{4}$" BLACK OR GALVANIZED PIPE, THREE PIECES 5 FEET LONG.
THREAD 2 PIECES ON ONE END AND THE THIRD PIECE ON BOTH ENDS. TURN INTO $\frac{3}{4}$" ELBOWS AS SHOWN.

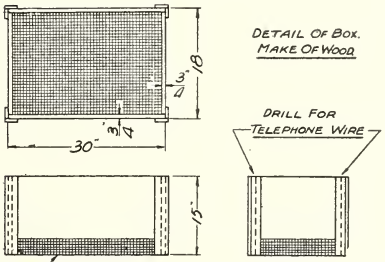
TO ERECT - DIG TWO HOLES 5 FT. APART, 12" DEEP. FILL WITH CEMENT, SET PIPES IN PLACE AND LET SET FOR 24 HOURS.

AS SHOWN IN THE DRAWING, THE SIFTER IS DESIGNED FOR OUT DOOR USE. IF IT IS DESIRED TO USE IT IN BASEMENT, SCREW TWO 1" SCREW EYES INTO JOIST 30" APART.









DETAIL OF BOX. MAKE OF WOOD

#3 HARDWARE CLOTH - $\frac{1}{2}$" MESH.
CORNER PIECES; 4 - $\frac{1}{2}$" x 2" x 15"
4 - $\frac{1}{2}$" x 2$\frac{1}{2}$" x 15". NAIL IN PLACE AFTER WIRE CLOTH IS ON.

TOY LION

Here is a most interesting toy for a Christmas gift, but attractive and desirable at any period of the year. He is an active fellow, standing on his head, his hind legs or front legs, as you choose.

Material

Any good wood, washers, screws, and paint are required.

Construction

1. First, make patterns of the various parts of the lion. If but one toy is to be made, lay out the pattern directly on the wood after it has been properly prepared. If more than one toy is wanted, lay out the patterns on thin cardboard or stiff paper, and then transfer them to the wood.

2. When the outlines of the various parts have been transferred to the wood, cut out the parts very carefully with a coping saw.

3. Cut the slot for the tail in the body of the lion, and then locate and drill the various holes for the screws, as marked on the patterns.

4. Sandpaper all parts well, keeping in mind that oft-repeated caution about sandpapering with the grain. Assemble with screws, placing small washers between the legs and the body.

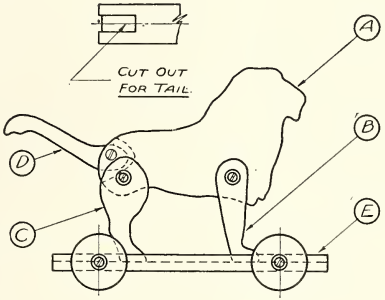
5. Make the cart next. Determine the width of the grooves measuring the spread of the legs after the assembling has been done. Remember that the feet of the lion should fit snugly in the grooves in order that they may be held in place.

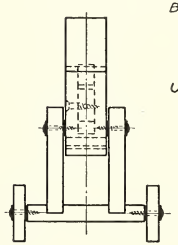
6. Make the wheels very carefully. They should be round, and careless work will not make them so. Lay out the circles with a pair of steel dividers, scribing rather deeply, then cut to shape with a coping saw. Assemble with screws, placing washers between the wheels and the body of the cart and also between the heads of the screws and the wheels.

Finish

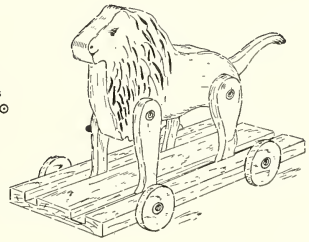
The toy will be much more attractive if it is painted, but no recommendations are made as to the colors to be used. Try, of course, to use the colors that will make the lion look as real as possible. The various parts will need to be taken apart for painting. Paint each piece, hang it up until dry, and then reassemble.

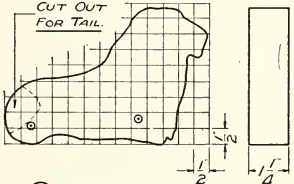
TOY LION.



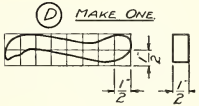


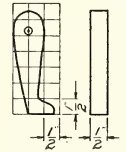
MATERIAL - ANY GOOD WOOD. PAINT TO SUIT.
BORE FOR R.H. SCREWS AT POINTS MARKED ⊙
TAIL IS TO BE FASTENED IN PLACE WITH F.H. SCREW.
USE WASHERS BETWEEN ALL MOVABLE PARTS.

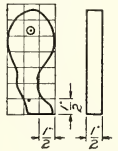


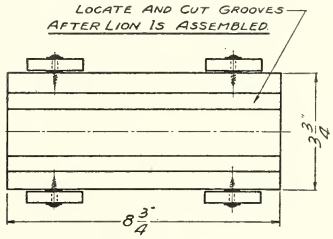


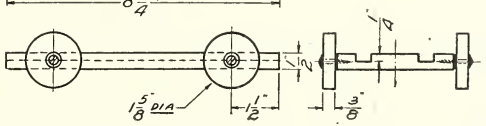
A MAKE ONE











E MAKE ONE.

HANDY PLAY TABLE OR WORKBENCH

This bench is doubly useful in that it can be used in the small size, by little brother or sister as a play table or footstool, and in the larger size as a workbench. Perhaps you will want to make one of each size.

Material

Wood, screws, and glue, if the large top is used, are necessary.

Construction

1. If the small stool is chosen, it is quite likely that a board wide enough for the top can be found, but if the large stool is decided upon, it may be necessary to glue two pieces together to get the necessary width. A dowel joint will be the most satisfactory in this case. It may also be necessary to glue up stock for ends of the large stool.

2. While the glue is setting, make the long pieces which fit just under the top and hold the two end pieces together, but do not cut the angles at each end. Do this later.

3. Lay out and cut the V in the bottoms of the end pieces. As designed, the stock may be removed with an ordinary saw. If you desire the ends more ornamental, however, make a design to suit, provided you have a large coping saw or a turning saw.

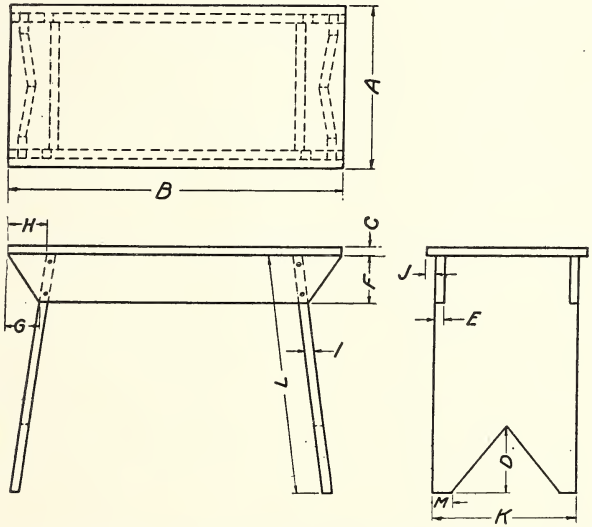
4. Determine how much slant you wish to give the end pieces; then lay off the proper angle for the stretchers and cut them. In this instance, hold the pieces in position while marking the angle. It is not advisable to have the slant of the end pieces so great that the bottom will fall outside a plumb line dropped from the top of the bench to the floor.

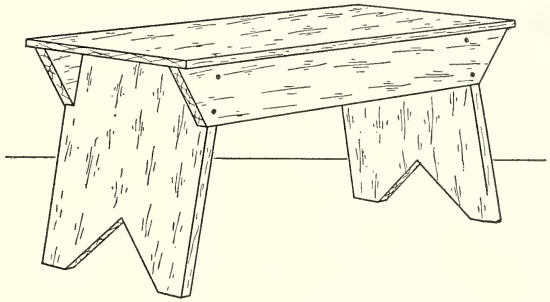
5. The bench will be stronger if assembled with screws, but nails may be used. Round-head screws are more ornamental than flat-head. To avoid splitting, drill holes in the stretchers for the screws. Sandpaper all surfaces well.

Finish

Paint the bench a light gray or straw, with the edges of the top, ends of the stretchers, and the edges of the design cut in the legs a light blue.

HANDY PLAY OR WORK BENCH





	A	B	C	D	E	F	G	H	I	J	K	L	M	N
LARGE SIZE	13½"	28"	⅜"	5"	¾"	4"	2½"	3"	¾"	⅜"	12"	20"	2"	
CHILD'S SIZE	10½"	21"	⅝"	4"	⅝"	3"	1⅞"	2¼"	⅝"	⅝"	9"	15"	1½"	

TOY CAMEL

Camels are not very pretty creatures, but have you ever noticed how much interest they always attract in a circus parade? Any boy is sure to enjoy making this toy.

Material

Use a good grade of soft wood which can be worked easily.

Construction

1. Lay out the patterns first. If only one toy is to be made, lay out the outlines of the parts directly on the wood. If several toys are wanted, you will save time if you lay out the figures on cardboard, and transfer them to the wood with these patterns. Lay out the ½-in. squares, and trace the outlines through them as shown in the drawing. Cut the parts from the wood with a coping saw.

2. Fasten the parts of the camel together with screws, using small washers between the movable parts of the body to insure freedom of action of the moving parts.

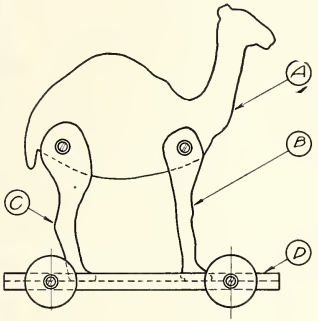
3. In making the cart, it is important that the grooves be located properly. The camel's feet must fit snugly in the grooves when it is standing up. As the spread of the legs varies according to the different thicknesses of the pieces, no dimensions are given for the grooves. These dimensions must be obtained after the parts of the camel are assembled.

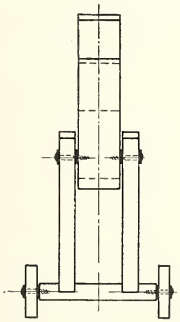
4. To make the wheels, lay out the circle with a pair of steel dividers, scribing deeply. This will give a line that can be worked to very easily.

Finish

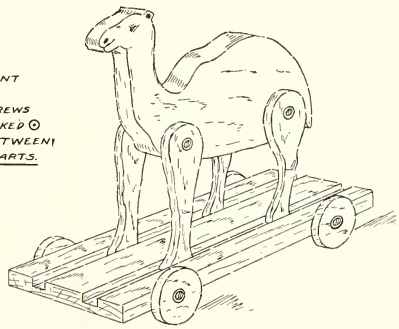
The parts should be painted to make the toy attractive. For the camel, choose a color that will look as much like the color of a real camel as possible. For the cart, red will be found attractive.

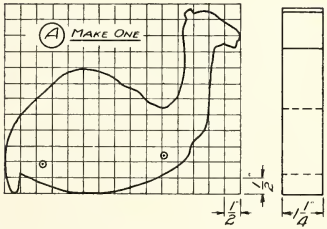
TOY CAMEL.

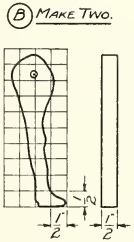


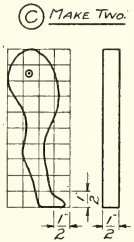


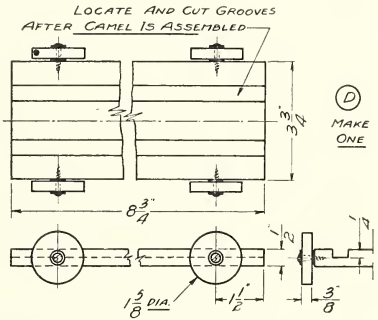
MATERIAL – ANY GOOD WOOD. PAINT TO SUIT.
BORE FOR R.H. SCREWS AT POINTS MARKED ⊙
USE WASHERS BETWEEN ALL MOVABLE PARTS.











WINDOW VENTILATOR

A sleeping room should have a good supply of fresh air, but it should at the same time be protected from dirt, snow, and rain. This ventilator will answer those requirements perfectly.

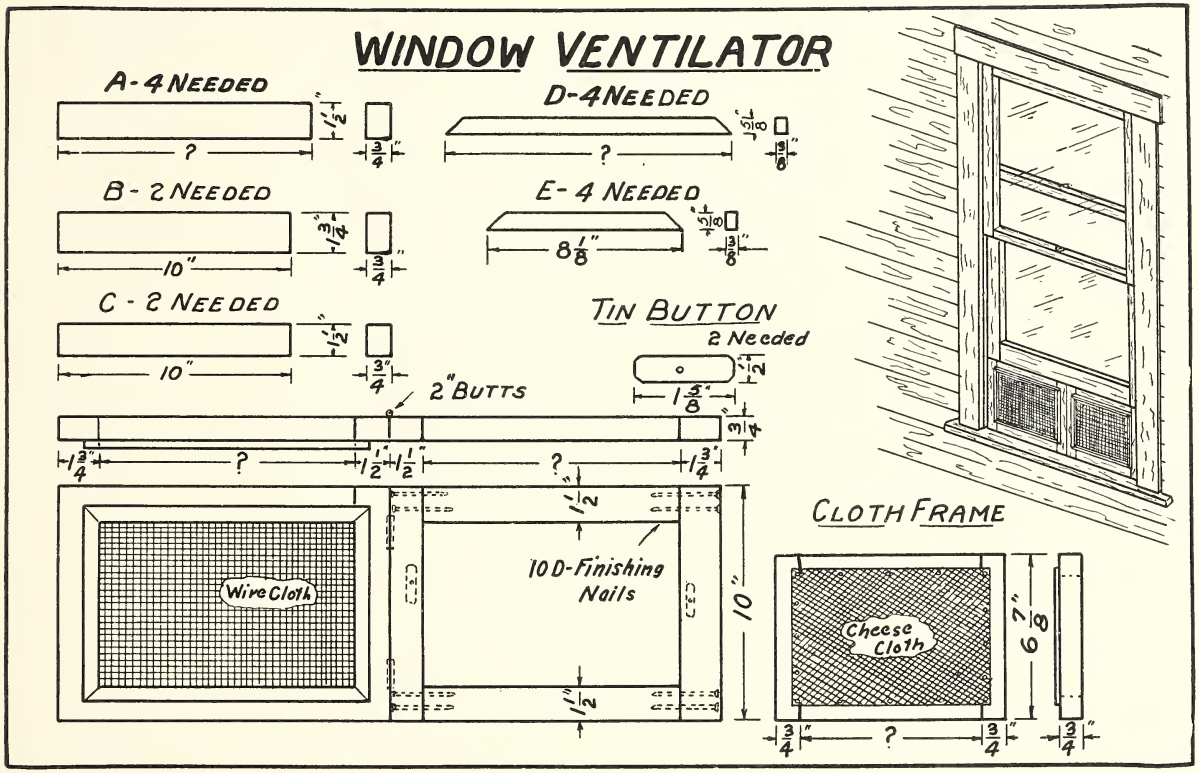
Material

Wood, brads, wire cloth, cheesecloth, and hinges are necessary.

Construction

1. First measure the window for which the frame is to be made; then make a list of the stock needed.
2. Plane pieces A, B, and C to size, and fasten together with 8-penny finishing nails. Set the nails deep, and fill the holes with putty before painting.
3. Make the moldings D and E of any scrap material, fit in place, and fasten temporarily with ½-in. brads. They are to be removed later.
4. Fit the hinges next, and place them so the pin shows on the side opposite the wire cloth.
5. For the tin button, use heavy-gauge tin or other soft metal. Cut the metal to shape and, with a prick-punch, make a hole at the center. These buttons are fastened to the side of the large frame and are used for holding the smaller frames in position.
6. Next make the frames for the cloth and fasten with nails as before.
7. Finish the frames and the molding with two coats of black, white, or dark-green paint as desired. When dry, tack the wire cloth to the large frames with 2-oz. tacks. Use a pair of pliers for stretching the wire. Brad the moldings to the frames to conceal the edges of the wire cloth.
8. On the small frames, tack a piece of cheesecloth, using the same size tacks. Turn the edges of the cloth to give a finished appearance and to keep the cloth from tearing away from the tacks.

To place in the window, raise the lower sash a distance greater than the height of the frame. Close the ventilator to about 135 degrees, place it with the ends between the window stops, open the ventilator to 180 degrees, then lower the sash until it rests on the upper edge of the ventilator.


WINDOW VENTILATOR
A-4 NEEDED
?
1 1/2"
3/4"
D-4 NEEDED
?
1/8"
B-2 NEEDED
10"
1 3/4"
E-4 NEEDED
8 1/8"
C-2 NEEDED
10"
1 1/2"
TIN BUTTON
2 Needed
1 5/8"
1/2"
3/4"
2" BUTTS
1 3/4"
?
1 1/2"
1 1/2"
?
1 3/4"
Wire Cloth
1 1/2"
10D-Finishing Nails
10"
1 1/2"
CLOTH FRAME
Cheese Cloth
7"
6 7/8"
3/4"
?
3/4"
3/4"

AUTO CREEPER

Many people prefer doing for themselves many of the tasks necessary to keep an automobile in good running order. When necessary to get under the machine, it is far from comfortable to slide underneath without some means of getting there quickly and smoothly. This little creeper, so called, will provide a means of doing this task easily.

Material

Any good wood, flat-head screws, and casters are needed.

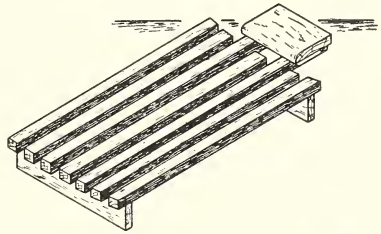
Construction

1. First, prepare all stock to the over-all dimensions.
2. Laying out the curve on the end pieces which support the slats may be done free-hand. It need not be an arc of a circle; any good, smooth curve is good enough. Anyone preferring a perfect arc may use a radius of 41½ in.
3. Make the front edge of the head rounder, and you may also pad it if you wish.
4. Assemble the pieces with flat-head screws. Locate and fasten the outside pieces first, then the center piece. Arrange the remaining pieces so they divide the rest of the spaces equally.
5. To make the creeper easily movable, attach a small caster of a good grade to each of the four corners.

Finish

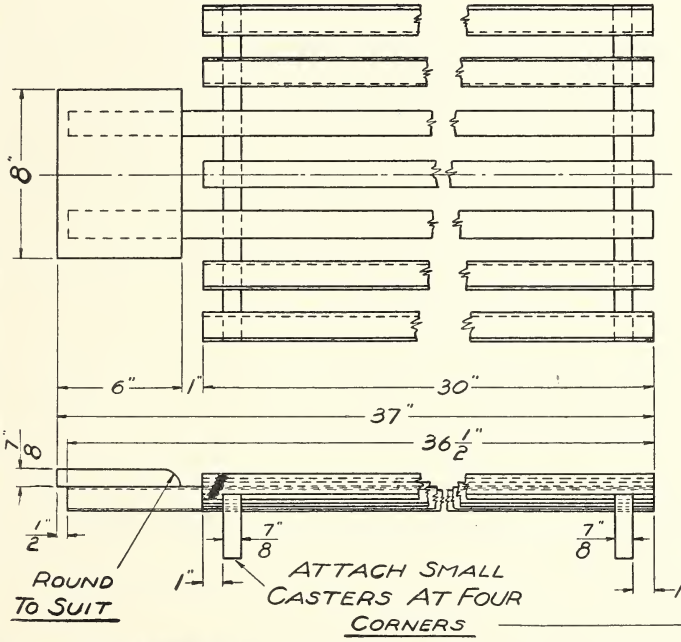
While it is not necessary to paint the creeper, it will look much better if it is painted a color that will make the accumulation of dirt less conspicuous. This is a matter to be left entirely up to the builder.

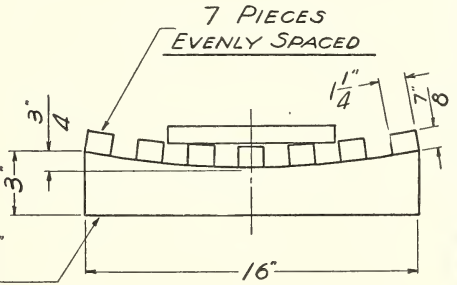
AUTO CREEPER



ASSEMBLE WITH F.H. SCREWS.

MATERIAL-ANY STRONG WOOD.





BINGO STICK AND PINWHEEL

These toys can be made with a jackknife and by anyone who is old enough to handle that tool.

Material

Wood, finishing nail, letter paper or tin, and a common pin are required.

Construction

1. Let us begin with the Bingo Stick. Use straight-grained wood cut to the dimensions shown. The handle is smaller than the rest of the stick to make it very flexible without breaking.

2. Lay off pencil lines, less than 1/16 in. deep, between which to cut the notches. If the notches are deeper than that, the Bingo will not change its direction quickly.

3. The Bingo is made from thin cardboard or tag board. The one shown on the stick is rectangular, but other forms like those illustrated may be used. Take your choice, and after the toy has been made and the principle understood, you may wish to design forms of your own.

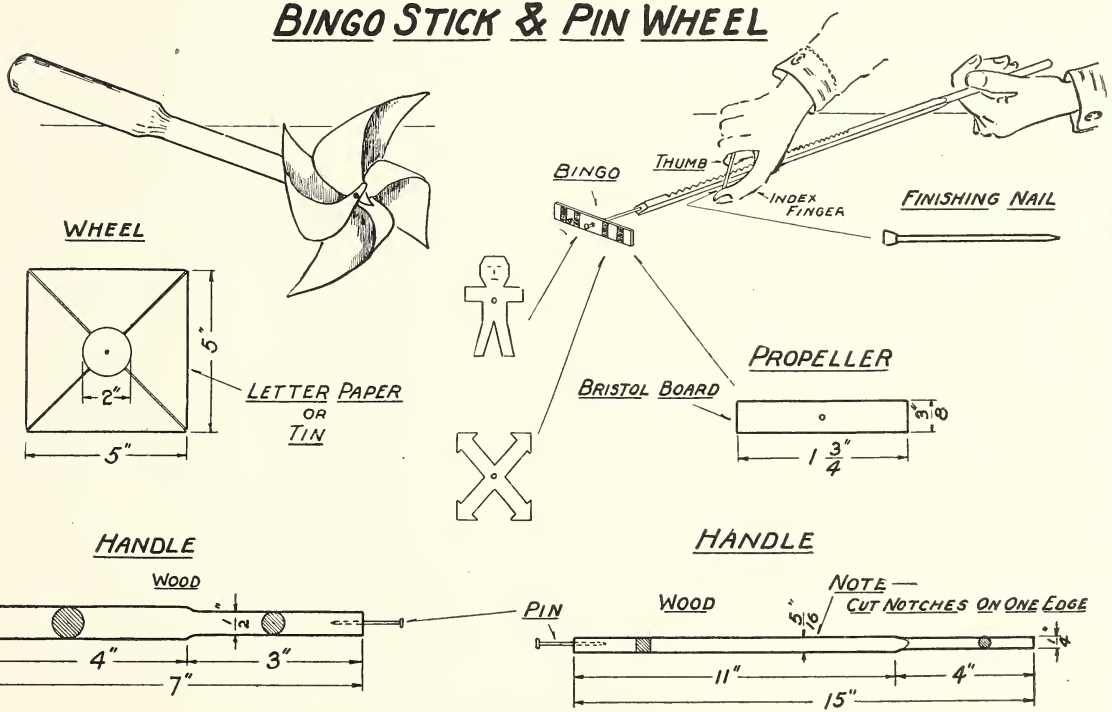
4. A common pin holds the Bingo to the stick. The hole in the Bingo should be large enough to allow it to turn easily.

5. To operate the Bingo Stick, take a match or finishing nail and hold it as shown in the drawing. Hold the stick by the handle in the left hand, and rub the match or nail over the notches causing the Bingo to revolve. The trick is to keep the Bingo revolving, and when the word "Bingo" is called, to reverse the direction of revolution. This is done by rubbing the thumb nail along one side of the stick, and when it is desired to change the direction of the propeller without stopping the rubbing motion, to move across the stick so the first finger rubs along the opposite side. This motion is not noticeable while the hand is in motion, but it causes the Bingo to reverse its direction. Practice a little in private before trying it out on your friends.

6. To make the pinwheel, cut a piece of letter paper or other stiff paper 5 in. square. Draw diagonals, and at the center describe a circle 2 in. in diameter. Cut on the diagonals, with shears, from each corner to the circumference of the circle.

7. Whittle a handle to the dimension shown, and fasten the wheel to the stick with a pin. The wheel will revolve with a motion of the arm or in a breeze.

BINGO STICK & PIN WHEEL



TREK CART

This is a particularly valuable piece of equipment for a boy-scout troop, and while the work involved is considerable, it can be made with no great difficulty. The facilities of a manual-training shop would be very helpful.

Material

Wood, bicycle wheels, steel for axle, bolts, lag screws, nails, wood screws, and carriage bolts are required.

Construction

1. The first requirement will be two bicycle wheels. If you have an old worn-out bicycle, the wheels and tires still may be good enough to use. Otherwise, you will have to purchase a pair.

2. The box is not difficult to make, and as shown at A, the bottom is set inside of the sides and ends. Fasten the bottom with screws, though nails may be used.

3. Make braces and axle supports, and fasten them to the box with bolts and lag screws.

4. Form the handles with a spokeshave and a turning saw, and fasten them to the box with carriage bolts.

5. Use the spokeshave and the turning saw also to form the leg. Fasten the leg to the box with a good strong strap hinge, and hold it in place with two screen-door hooks.

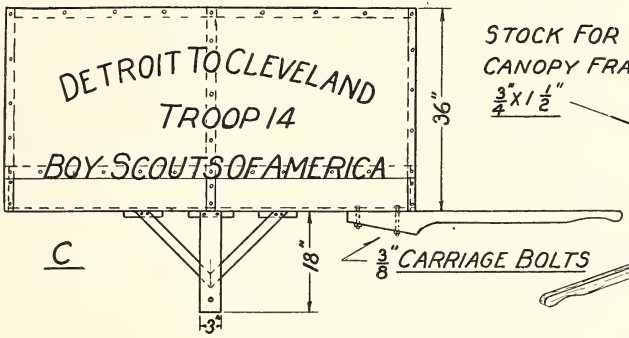
6. The axle for the wheels will have to be made in a machine shop, for which you, no doubt, will be charged.

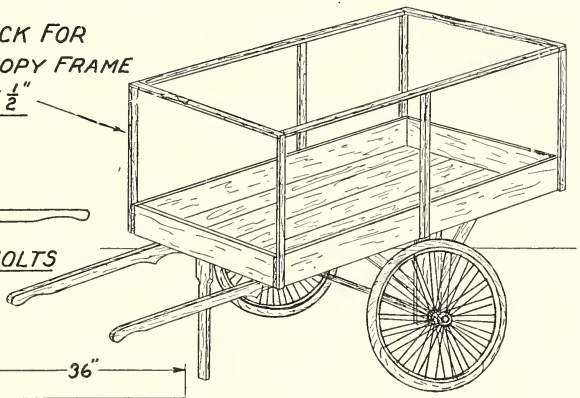
7. Make the canopy for the box from an old piece of tent, fastened in place with carriage buttons, the eyes for which will have to be put in place in a harness shop.

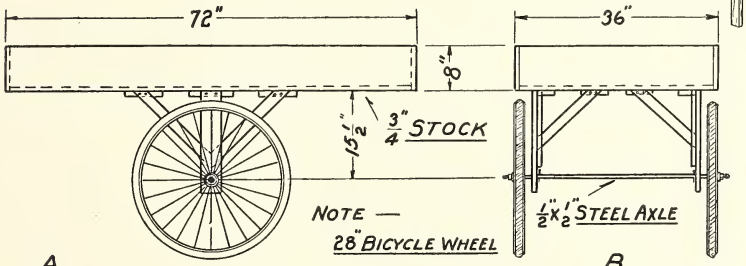
8. Paint the parts of the cart to match the material used for the canopy.

The equipment of the cart usually includes a small tent, blankets and other bedding, extra clothing, a cooking outfit and such other things as the wishes of the boy indicate. The loaded cart will not be difficult to haul.

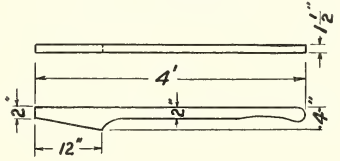
TREK CART







HANDLE



DOUBLE WINDMILL

Unlike a kite, which is more or less of a seasonal toy, this windmill will be interesting at any time of the year.

Material

Wood, nail, and washers are necessary.

Construction

1. Select your best pieces of wood for the vanes. Note that they are not alike. Lay them out carefully, but before cutting to shape, bore the hole for the nail on which the vanes revolve. This hole should be just large enough to permit the vanes to turn freely but without wobbling.

2. In shaping the vanes, use a good sharp knife. If the wood is slightly cross-grained, there will be a tendency for the knife to follow the grain. This must be carefully watched.

3. Next is the part that rests on the upright. Examining the drawing, you will notice at certain points small spaces across which light lines have been drawn at an angle of 45 degrees. These are cross sections and show the shape of the piece at this point. Cross-grained wood also will cause trouble with this piece; so be careful when shaping it.

4. The upright may be made of almost any piece of wood. No dimensions are given, for the size will depend entirely upon the place where the windmill is to be set up.

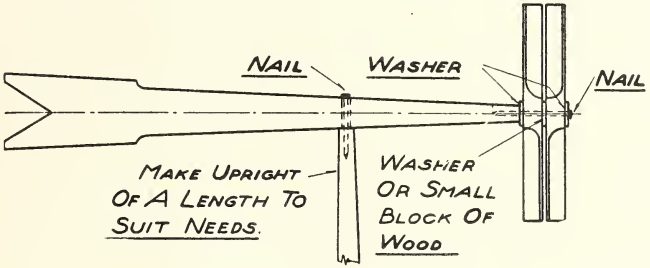
5. Place washers between all moving parts to permit them to revolve easily. The success of the windmill will depend upon the ease with which it works.

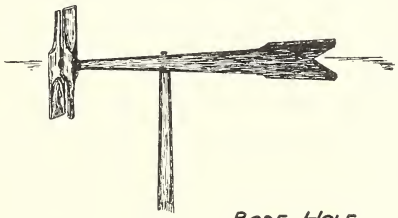
6. The particular feature of the toy is that one of the vanes revolves to the right while the other revolves to the left.

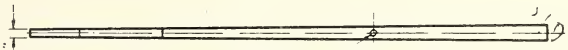
Finish

Both from the standpoint of protection and appearance, it is suggested that the toy be painted, using your own color scheme. In painting, be careful not to permit paint to fill the hole in the vanes, and interfere with the ease of their operation.

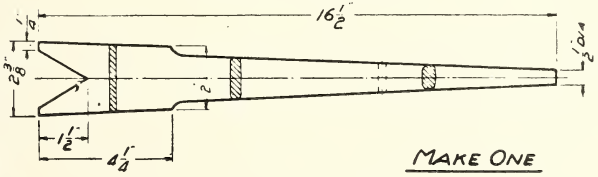
DOUBLE WINDMILL





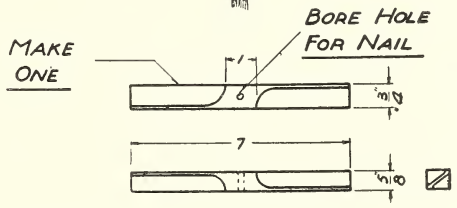


BORE HOLE FOR NAIL AT POINT OF BALANCE

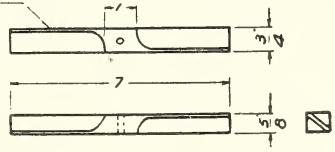


MAKE ONE

MAKE ONE



MAKE ONE



HOLDER FOR SALT AND PEPPER SHAKERS

This holder was designed to accommodate square shakers, but it may be modified to suit any type desired to be used. The important thing in a drawing of this kind is the design. The dimensions may be changed as found necessary.

Material

Gum or other wood that will finish well should be used.

Construction

1. Get out the stock for the part with the holes. Use a piece the same length and width as the bottom piece, and a thickness equal to 2¾ in. less the thickness of the bottom. This will make a square piece of stock to work with. Lay out and bore the holes, working from both sides of the piece, bringing it to shape with a chisel.

2. Remove the portion where the handle is to be inserted, sawing with great care. Cut out the bottom, and glue it to the part just finished. While this is drying, make the handle, and glue it in place after the other parts have set.

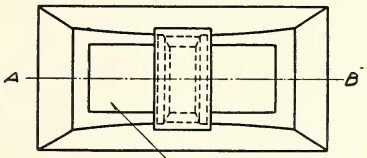
3. Lay out the curves on the ends and saw them to shape, following with the curves on the sides. A power band saw will be valuable here, if available. The first operation is not difficult because there is a flat surface to support the piece while sawing, but the next operation is not so easy because part of the stock has been removed, leaving nothing to support the piece while sawing. To help in this step, get a piece of stock 4 or 5 in. long and as thick as you can use it without interfering with the sight of the curves to be cut, making sure that two surfaces of the piece are exactly square with each other. With one of these surfaces on the saw table and the other resting against the piece to be sawed, a good support will be given for the work.

4. The knob is more difficult to make. First square it up to the largest dimension; then lay it out and cut the mortise. Next lay out the various curves and cut them to shape. The limits of the curves are given, but the actual designing of them is left to your own taste. Fasten the knob in place with glue.

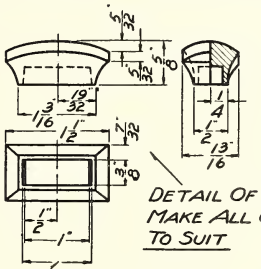
Finish

Stain to match the dining table or any other object on which the holder is to be used. Apply a thin coat of shellac, rub down with fine sandpaper, and then finish with wax.

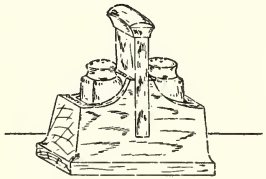
HOLDER FOR SALT AND PEPPER SHAKERS.



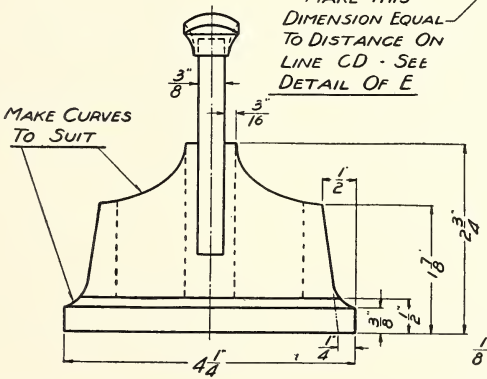
CUT HOLES TO SUIT SHAKERS ALLOWING 1/16" PLAY ALL AROUND



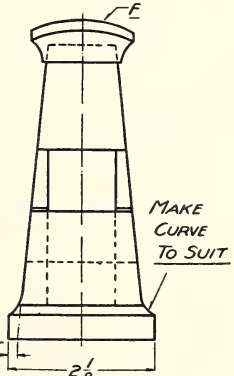
DETAIL OF F. MAKE ALL CURVES TO SUIT



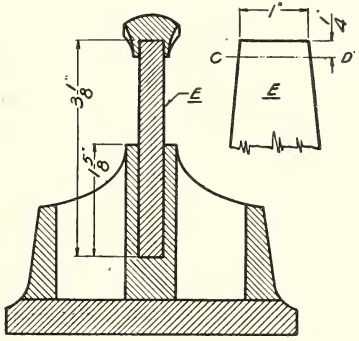
MAKE THIS DIMENSION EQUAL TO DISTANCE ON LINE CD - SEE DETAIL OF E



MAKE CURVES TO SUIT



MAKE CURVE TO SUIT



SECTION ON AB.

PAINT OR SHELLAC CAN

With an article of this kind available, there can be no excuse for ruining good brushes because of failure to have a proper receptacle to care for them. This article is worth many times the amount of time necessary to make it.

Material

Wood, tin cans, a soldering outfit, and a broomstick are required.

Construction

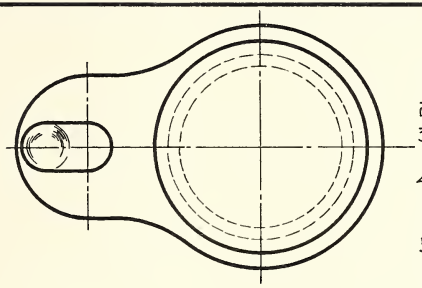
1. Select cans of a size to suit, changing the various measurements in the drawing as necessary. With the dimensions given, an ordinary Crisco or coffee can may be used for the outside protection.

2. Get out the base, laying out the design as shown, or changing it to care for a larger can. Making this base will be good practice for laying out work with a compass. Bore the hole for the handle before cutting the part to shape, the size of the hole depending upon the size of the broomstick. It is not likely that you will have a bit just the right size for boring this hole, so it will be necessary to choose the one nearest the right size, making it smaller rather than larger.

3. Assembling is simple. Tack the top of the outside can to the base; then fasten the smaller can as explained in the drawing. By placing the body of the larger can over the smaller can and into its own cover, an excellent protection is provided for the brushes.

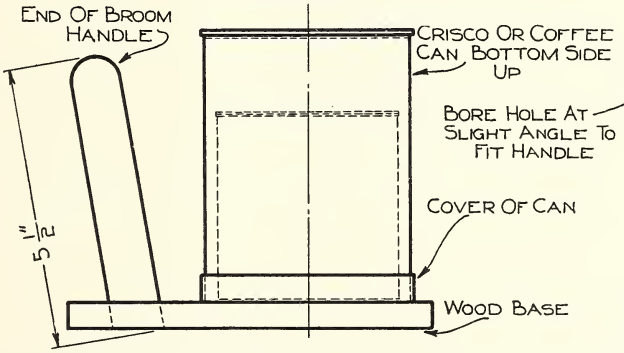
Use

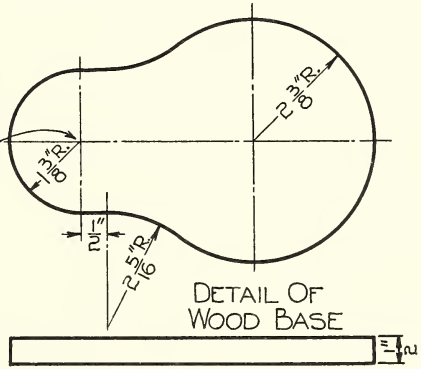
Brushes, to be kept in good condition, should never be allowed to stand on the bristles, but should be suspended. To do this, bend a piece of wire into the form of a hook, fasten it to the brush, and place the hook over the edge of the can. Adjust the wire so the bristles do not touch the bottom of the can.



PAINT OR SHELLAC CAN

1-TACK COVER OF LARGE CAN TO BASE.
2-PUT SOLDERING PASTE ON COVER.
3-PLACE SEVERAL DROPS OF SOLDER ON BOTTOM OF OUTSIDE OF SMALL CAN.
4-LOCATE SMALL CAN IN CENTER OF COVER; PRESS ON BOTTOM OF INSIDE OF CAN WITH HOT IRON UNTIL SOLDER MELTS.
5-SOLDER AROUND OUTSIDE EDGE OF CAN.





CLOCK CASE

To make this case, it will be necessary first of all to have the clock to be used in it. The general dimensions given will permit the use of a clock with a face measuring from 2¼ to 2⅝ in. in diameter. For a clock larger or smaller, the dimensions must be changed.

Material

Gumwood takes an excellent stain in brown or mahogany; therefore, it will make a very satisfactory job. Small brads will be needed for the feet.

Construction

1. Select wood of a thickness to suit the thickness of the clock. Square it up to the largest dimensions, and lay out the design. The suggestive designs fit the general dimensions given in the drawing. Bore the hole for the clock before working the outside form to shape. Use an expansion bit for this work, adjusting it to the size of the clock to be used. Locate the center of the hole on both sides of the stock and bore halfway from each side.

2. Cut the outside form to shape with a turning saw, but if the stock is not too thick, use a coping saw. Do this part of the work very carefully.

3. Next, make part C and the four pieces of the feet.

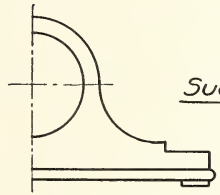
4. Sandpaper all pieces and assemble with brads.

Finish

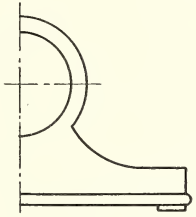
To obtain a good finish, all surfaces must be made perfectly smooth. A great deal of end grain will be exposed in this model and unless these surfaces are particularly smooth, in fact almost polished, the stain will be absorbed heavily and some parts become much darker than the others. Apply the stain lightly to the end grain and rub it off immediately. Even with this care these surfaces may be darker than the rest, in which event it will be necessary to go over them with fine sandpaper.

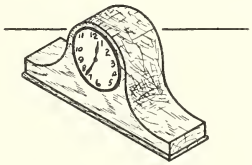
A wax finish or shellac may be used, applied in thin coats and rubbed down with very fine sandpaper and oil.

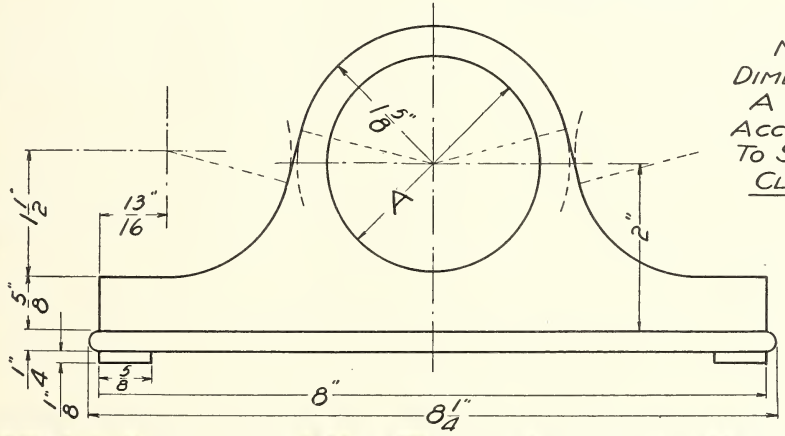
CLOCK CASE



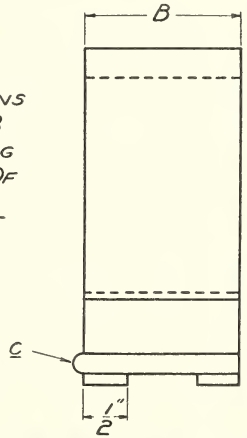
SUGGESTIVE DESIGNS







MAKE DIMENSIONS A AND B ACCORDING TO SIZE OF CLOCK



WHEELBARROW

This is not a toy, but a very serviceable vehicle which may be found in many homes.

Material

Wood, screws, washers, and gas pipe are necessary.

Construction

1. The material will have to be purchased, no doubt; hence, the very first thing to do is to prepare a bill of material.

2. Make the frame first, with the spread of the handles uniform. Lay out a line on the floor, and lay off one half the spread on each side of the line. In assembling, be careful that the holes which have been bored for the piece of gas pipe line up perfectly.

3. Next make the bottom. No dimension for length is given. Start 20½ in. from the handle end of the frame and fill the space to within 3 in. from the other end.

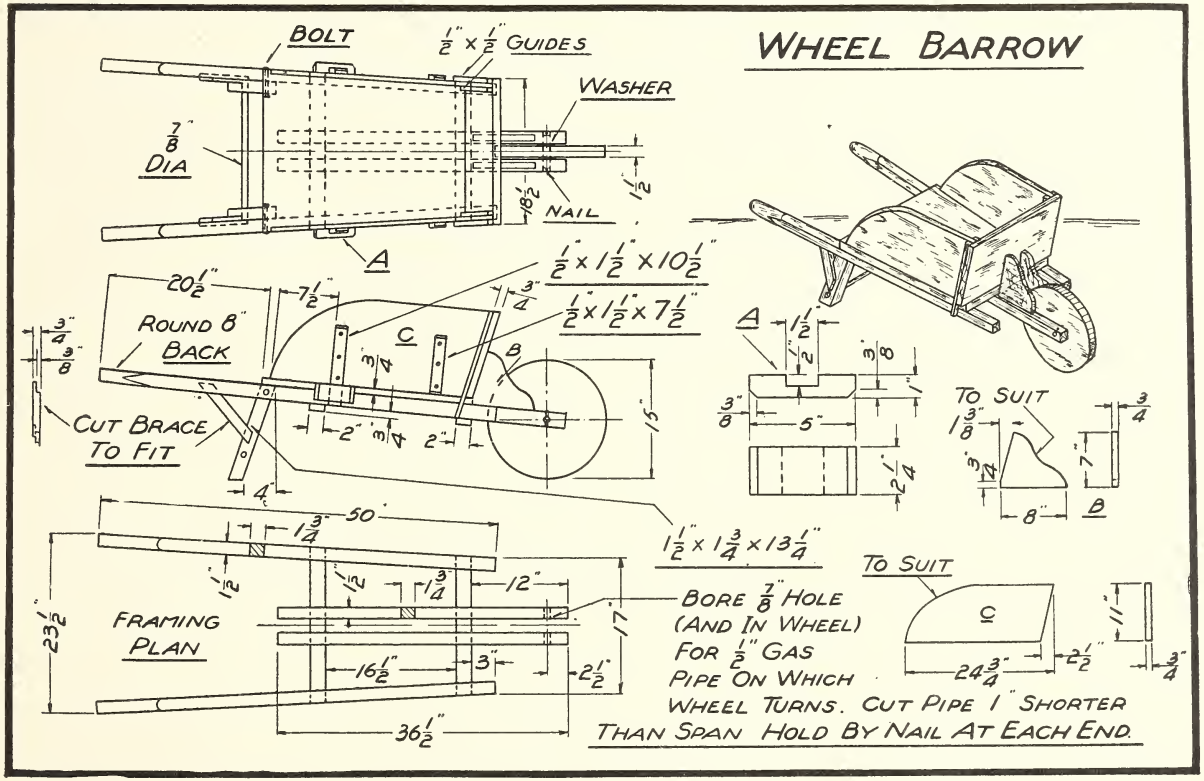
4. Cut the braces and fasten them to the two center pieces. Make the end piece enough wider than the bottom at that point to permit one of the guides to be fastened to it, extending down over the frame. Fasten the other guide to the end piece a distance inside the first sufficient to permit the side piece to enter this groove. Fit both ends of the end piece in this manner. Part A receives one of the cleats fastened to the side, thus holding the side piece in place.

5. The most difficult piece to make is the brace which runs from the handle piece down to the front leg. Hold it at the required angle against the leg and handle, mark carefully, and cut it to shape.

6. In making the wheel, it is highly important that it be made round. Lay it out with care, and cut exactly to the line. The hole at the center for the pipe must be bored straight through. Line the rim of the wheel with a piece of sheet metal.

Finish

While it is not necessary to paint the wheelbarrow, the wood will last longer if it is protected with a coat of paint and, of course, it will look better. Green is a good color to use.


WHEEL BARROW
BOLT
1/2" x 1/2" GUIDES
WASHER
7/8" DIA
NAIL
A
1/2" x 1 1/2" x 10 1/2"
1/2" x 1 1/2" x 7 1/2"
20 1/2"
7 1/2"
3/4"
ROUND 8" BACK
C
B
CUT BRACE TO FIT
15"
4"
2" 3/4 2"
1 1/2" x 1 3/4" x 13 1/4"
50"
1 3/4"
1 1/2"
12"
FRAMING PLAN
23 1/2"
16 1/2"
3"
2 1/2"
17"
36 1/2"
BORE 7/8" HOLE (AND IN WHEEL) FOR 1/2" GAS PIPE ON WHICH WHEEL TURNS. CUT PIPE 1" SHORTER THAN SPAN HOLD BY NAIL AT EACH END.
TO SUIT
5"
2 1/4"
1 3/8"
8"
TO SUIT
24 3/4"
2 1/2"
11"

TOOTHPICK TOYS FOR GIRLS AND BOYS

While the older boys are using tools and are working at the bench, younger boys and girls will enjoy constructing animals, furniture, and buildings with peas and toothpicks.

Material

Only dry peas and common toothpicks are required. The thin, flat toothpicks will work better than the round ones.

Whole peas can be obtained from a grocery store. To prepare them for use, place them in a bowl containing enough water to cover the peas, and allow them to soak from 6 to 8 hours. The exact length of time for soaking cannot be given, but experience will enable you to judge how long they are to be soaked before they are ready to be used. If the peas are not soaked long enough, they will split when the toothpicks are forced into them, and if soaked too long, the skin will peel off allowing the pea to crumble.

Construction

1. Cut the toothpicks in different lengths, and sharpen the points with a jackknife. At times it is convenient to have a pea at the center of a toothpick. To force the pea to the center of the toothpick without splitting the pea, whittle the toothpick rather thin to the center.

2. First make an article that is not so difficult. The serving table is probably the easiest project suggested in the drawing; it, therefore, may be made first. Consult your key in the lower right-hand corner of the drawing for the length of toothpicks and parts needed. Carefully force peas on the end of each toothpick, and then continue to frame up the work with other whole and parts of toothpicks.

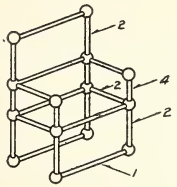
3. Set the completed projects away, and allow the peas to dry. As they do so, they will shrink, holding the ends of the toothpicks firmly.

4. After the peas have dried, you may tint the toothpicks and the peas with water colors.

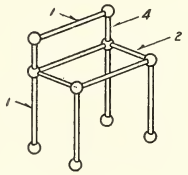
5. Make some of the other objects, following the numbers for sizes, of toothpicks given in the drawing. By cutting paper, cardboard, and tinfoil shapes to glue and attach to the toothpick ends and frames, you can make many complicated and pretty projects.

TOOTHPICK TOYS FOR GIRLS AND BOYS.

MATERIALS - DRY PEAS AND COMMON TOOTHPICKS

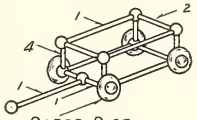


SETTEE

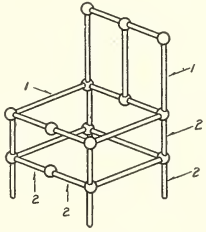


SERVING TABLE

WAGON

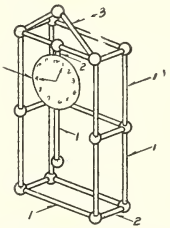


PAPER DISC.

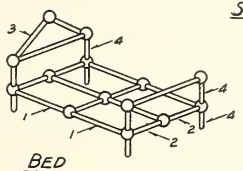


CHAIR

PAPER

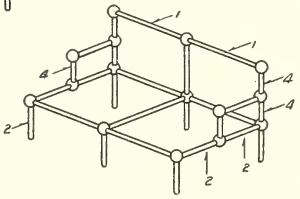


GRANDFATHER CLOCK

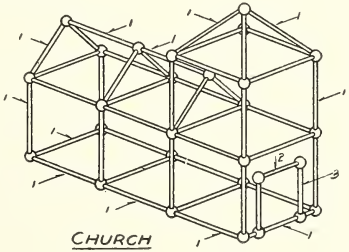


BED

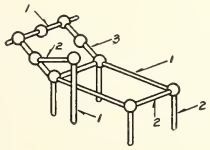
A LITTLE THOUGHT WILL
ENABLE ONE TO MAKE MANY OTHER
COMBINATIONS



DAVENPORT



CHURCH



CHAISE LOUNGE

KEY

1 = 1 TOOTHPICK
2 = 1/2 "
3 = 3/4 "
4 = 1/4 "

DUTCH WINDMILL

A Dutch windmill is a very attractive weather vane, and if a hole is bored in the rear wall of the house, the wrens may use it for a nesting box.

Material

Common packing-box lumber, which usually is white pine, is excellent for this project. Cypress, redwood, or other woods that will not warp and be affected by the elements are also recommended.

Construction

1. Plane to size a piece of board according to drawing dimensions for part A.

2. Make the lower portion of the house which is composed of two parts like B and two like C, assembling it with 1-in. wire brads. Make the floor D, bevel the edges so it will fit in place, and assemble with brads. The roof F and the two peak pieces should be made and assembled next, after which the roof should be nailed to the walls. Before assembling the front peak, however, cut out a section to receive the windmill shaft G which should be securely fastened so the motion of the windmill will not loosen it. Make the roof boards, plane bevels on the necessary edges, and assemble them to the peak boards.

3. Now lay out and cut to size parts H, I, and J, assembling them with brads in position as shown by the drawing. Part H is fitted through a mortise cut in I, and extends through I far enough to allow a brad to be driven through it as shown.

4. Next make the windmill blades as shown by the detail in the lower right-hand corner. The 8-in. pieces are half lapped at the center and the hole X is bored for a nail or screw to assemble the mill to part G. Note that sections of the 8-in. arms are sawed away to receive the thin paddle strips at the proper angle to cause the mill to revolve when the wind blows. Make and assemble the blades with brads.

5. Whittle a shoulder on the end of a stick about 16 in. long, indicated by M, to fit a hole that should be bored through A and the bottom or floor of the mill house. Nail this part M to a post or some place where the wind can revolve the mill on it, always keeping the front of the house facing into the wind.

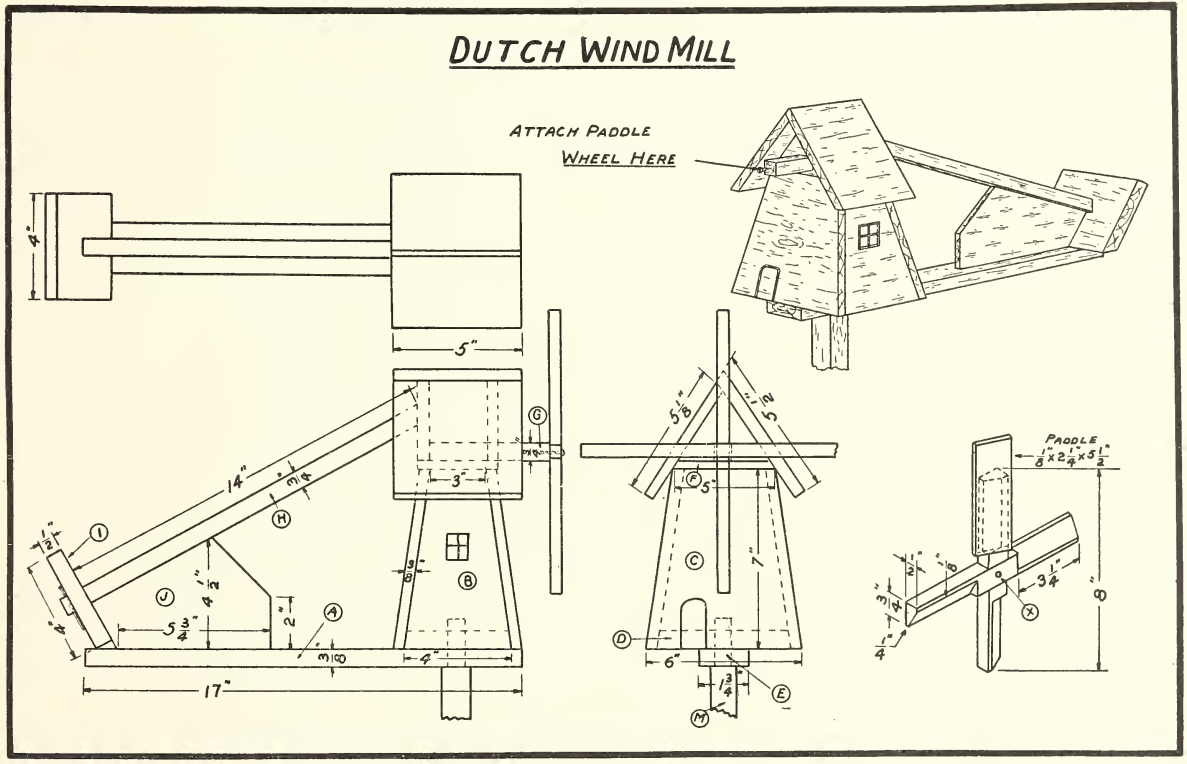
Finish

1. Sandpaper all rough edges and surfaces, and round the corners.

2. Fill any cracks and nail holes, caused by setting heads of nails, with putty.

3. Paint the house and all parts but the tail, the windmill, and the roof boards white. Paint the roof green and the mill and the tail red. With a fine brush, stripe in the doors and windows with black paint.

DUTCH WIND MILL



TOWEL HOLDER

This towel holder is to be fastened to the wall, a casing, or other desirable place, with screws. The shape of the back can be changed to fit any space, or a number of marble arms can be assembled to a long backboard. Each marble arm is supposed to hold one towel. The towel is held by being wedged between the marble and the backboard when the towel is slipped in place and pulled down. To release the towel, it is pulled upward pulling the marble to a deeper depression when the towel is easily slipped out sideways.

Material

Use black walnut, gumwood, or other material that is straight grained and can be easily carved, as depressions are to be carved in both parts.

Construction

1. Square up the back piece 5/8 by 3¾ by 6 in., and draw center lines lengthwise, on which to locate the screw holes, and across the width as AB, on which to lay out the location for the marble arm, the holes for screws to hold it in place, and the depression for the marble.

2. Bore screw holes, and, with a gouge, make the marble depression. On the back of the piece, countersink the screw holes for assembling the marble arm.

3. Lay off and cut the corners, and plane off the saw marks.

4. Use a pencil for marking, and lay out the ¼-in. chamfer around the top edge of the piece, then plane the chamfer to line.

5. Work to dimensions a small piece for the marble arm; then with a backsaw remove the section as shown in the drawing. Bore small holes to receive the screws, and gouge out the depression as shown by the cross section through AB. Work out the gouged depressions with sandpaper perfectly smooth so there will be no flat surfaces to cause the marble to stick.

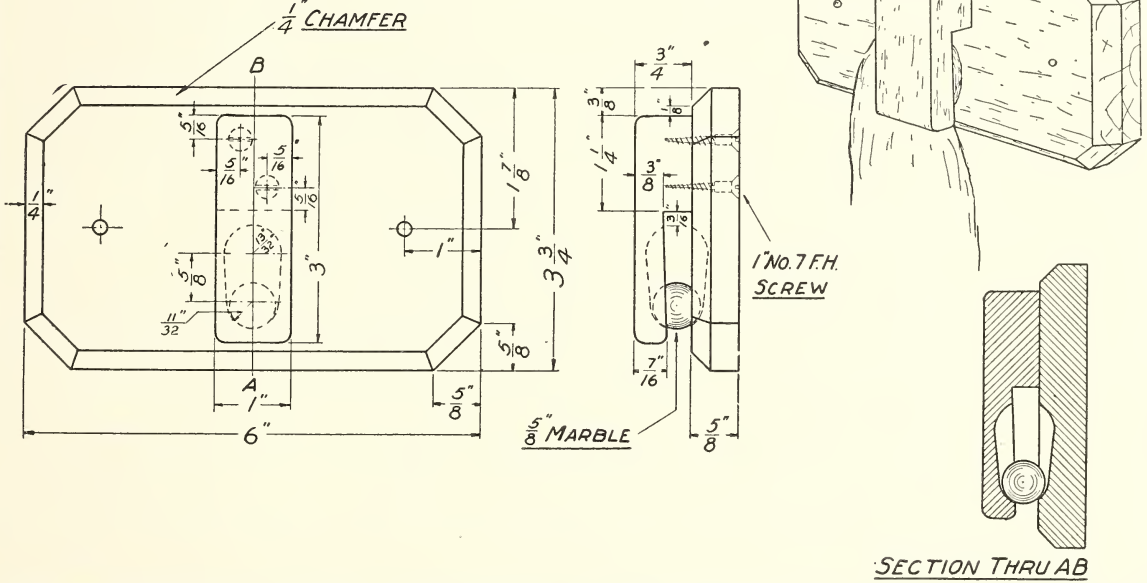
6. Set the marble in place, and assemble the parts with glue and screws, as indicated in the drawing.

Finish

1. Sandpaper all surfaces and edges with No. ½ sandpaper, and finish with No. 00 sandpaper.

2. The finished project may be rubbed with linseed oil, shellacked, or given a coat of stain and shellac.

TOWEL HOLDER



BALANCE SCALE

This scale may be used as a toy for playing store, or by the amateur photographer for weighing out chemicals; in fact, it can be used by anyone who wishes to balance up articles that must be the same weight.

Material

Basswood or white pine are good woods for making this project. They will be found easy to plane and to saw.

Construction

1. Make the base ½ by 3 by 12 in. The ends are shown square but may be rounded to conform to the shape of the weight pans; or the ends and edges may be chamfered.

2. Make the post and brace, and assemble it to the base with brads or screws and glue. Note that the corners on the top of the post are slightly rounded.

3. Lay out the beam, and taper it with a plane according to the dimensions given. Locate the center by balancing it on a knife blade, and be sure it balances perfectly. Hang the beam on a round-head screw driven into the post.

4. Screw a small screw eye in each end of the beam, and in the eyes tie strings to which the pans are hung.

5. Use two coffee-can covers of the same weight for the pans. With a nail, punch holes in the rim of the pan to receive the strings.

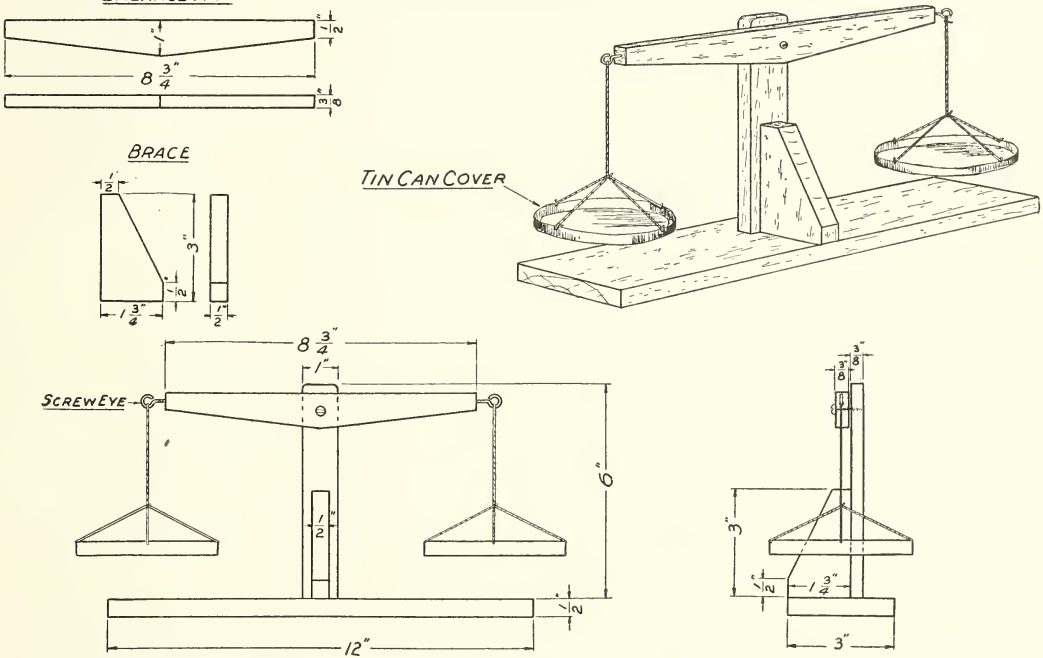
6. Make weights by pouring lead into a sand mold and then testing it on a good commercial scale. Lead weights are suggested because they can be lightened by cutting away the lead or made heavier by driving screws or pieces of metal into them.

Finish

1. Sandpaper all surfaces with No. ½ sandpaper.

2. Paint the base, post, and brace black, and the beam and pans red. Other colors may be used if the colors suggested are not on hand.

BALANCE SCALE



LAP BOARD

A good lap board should be in every home. Its use as a lap board will be attractive to mother, and the added use as a checker board makes it interesting to other members of the family.

Material

Good wood free from imperfections should be used. In addition, you should have a dowel rod, glue, a broomstick, and a tapeline.

Construction

1. It is not likely that you will be able to find a board 20 in. wide, so it will be necessary to glue several pieces together to get the correct width. A plain butt joint may be used, though a dowel joint will be stronger.

2. If a dowel joint is used, proceed as follows. Plane one edge of each of two adjoining pieces so that when they are placed edge to edge and held to the light, no light will be seen at the ends but light can be seen at the middle. This is done so that when the pieces are clamped together, the pressure necessary to bring the two pieces together at the center will cause extra pressure at the ends sufficient to overcome the shrinking which is bound to occur and would otherwise allow the ends to separate slightly. As each set is completed, mark the pieces to be sure they are put together correctly later. Reverse the rings of growth in the pieces.

3. Next, lay out the location of the dowels. With a marking gauge, mark a line down the center of each edge, gauging from the sides on which you have placed your marks for insuring the correct assembly of the pieces. Across the edges at the center and 3 or 4 in. from each end, make a knife line. At these points bore ¼-in. holes 1¼ in. deep. Make the dowel pins 2⅛ in. long, nicely round the ends, apply a thin coat of glue to them, insert in place, and put the boards in a clamp. It will probably be necessary to apply the clamp from each side in order to keep the boards from bowing.

4. After the glue has set, square up the board and lay it out as shown in the drawing; then saw to the lines with a coping saw.

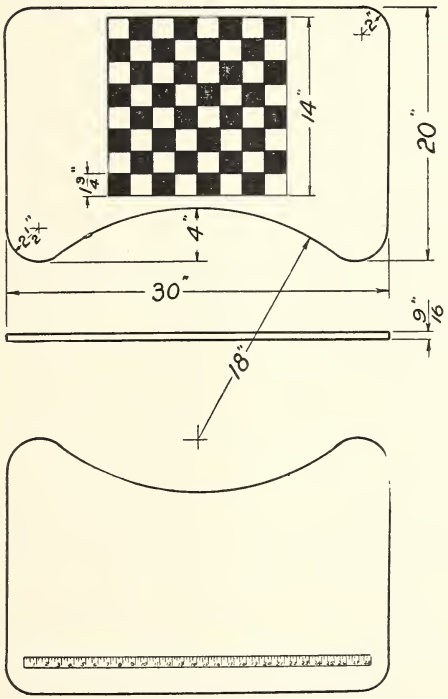
5. Lay out the checkerboard with a sharp-pointed knife and a carpenter's square, but be careful not to let the knife slip in this operation. The knife lines will prevent the paint from running over into the next square.

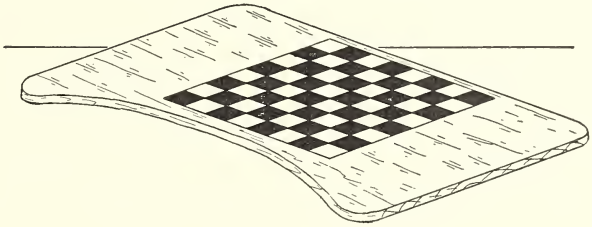
6. Red and black paint may be used for coloring the squares, or, if preferred, shellac may be colored and used. If this is done, be sure that the coloring material is first mixed with alcohol and then added to the shellac.

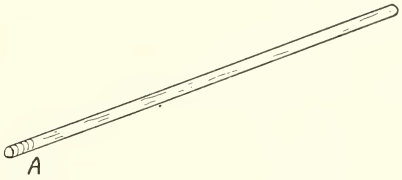
7. Get a cloth tapeline, cut off 28 in., and after the paint is dry, glue this on the opposite side of the board as shown. Then give the whole board several coats of thin shellac which will make the board easy to keep clean.

8. Checker men may be purchased at a ten-cent store, or they may be made by sawing pieces from a broomstick as at A. Color them with common dyes.

LAP BOARD







KITES

Anyone who has ever taken part in the sport of kite flying, knows how much fun it is to get his friends together on a bright, windy, spring day and hold a kite-flying contest. Of course, if prizes are awarded for the highest-flying kite, the best design, best workmanship, or the one that takes up the longest string, the sport is more exciting.

In the drawing, directions are given for making several types of kites. The two-stick and three-stick kites are perhaps the most common. Both are very easily made and require a tail of sufficient weight to keep them from diving. A good tail can be made of strips of cloth tied together.

Perhaps it is the feeling of satisfaction which comes of knowing that one is in full control of that tiny-looking thing sailing high up in the air — just under the clouds perhaps — that makes kite flying one of our ideal pastimes. Try to make a kite as follows.

Material

Strips of cedar, basswood, or cigar-box clippings; paste, paper, string, glue, and rags are required.

Construction

1. From a dry, straight board, or cedar post, split sticks for the kite you wish to make, and cut them to length. Fasten the sticks at the intersection with cigar-box nails, and glue and bind with string. The dimensions for the kite sticks are given in the drawing.

2. The double-dotted lines represent the sticks, while the single-dotted lines represent strings tied to the sticks to hold them in place.

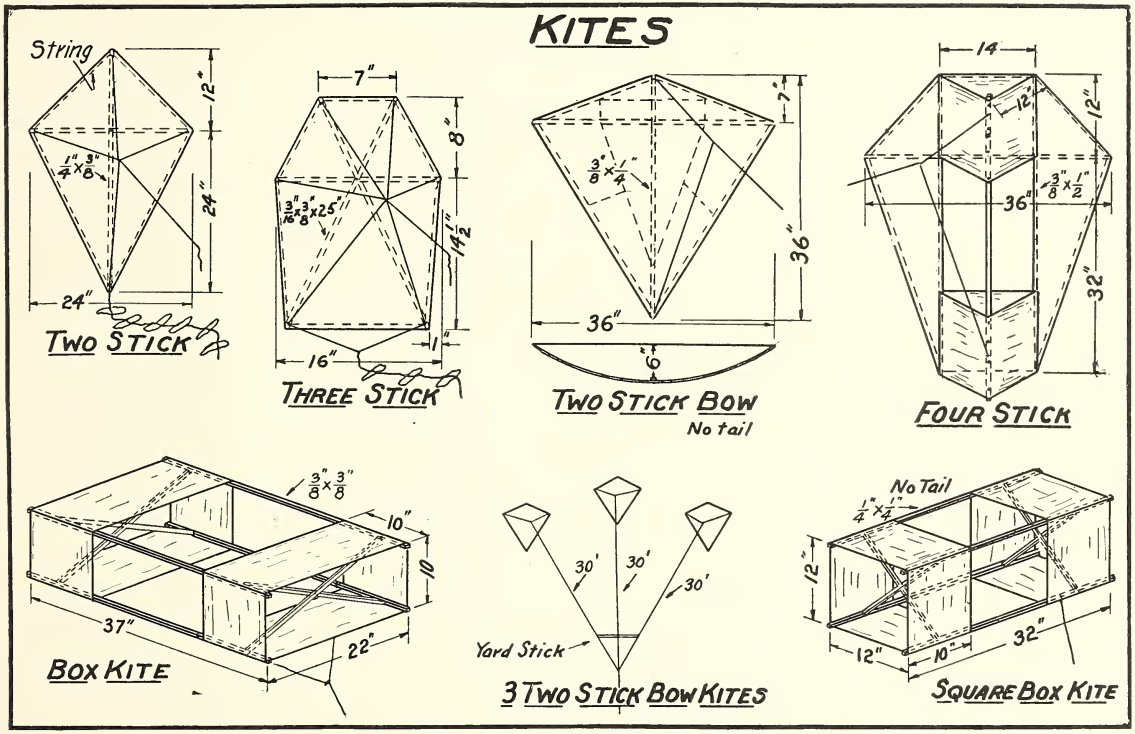
3. Cover the frame with tracing cloth, heavy, colored tissue or Japanese paper, or starched cloth through which the wind cannot blow. Fasten the covering with glue, or cooked flour and water paste.

4. A bridle or bellyband is necessary for attaching the tail and kite string. The length of the bridle and its adjustment are important for the successful flying of the kite, and can be determined only by experimental flights. Make the bridle of string, and tie it to the sticks after threading it through holes punched through the covering on each side of the stick.

5. The two-stick, crossbow kite usually is a favorite. The cross stick of the frame is bent back about six inches. The small sketch in the center of the drawing shows three of these crossbow kites attached to one string. It is great sport to fly the three at once, but much skill is needed to get them all up, and a very strong line is required to hold against even a light breeze. A yardstick should be placed near the meeting point of the three separate strings to keep the kites apart when they are in the air.

6. The four-stick kite usually wins the altitude contest. It is easy to make, but instead of tissue paper, tracing cloth should be used for covering.

7. The box kites are carefully detailed, and should be covered with cloth or heavy paper.


KITES
String
12"
1/4" x 3/8"
24"
24"
TWO STICK
7"
8"
3/16" x 3/8" x 25"
14 1/2"
1"
16"
THREE STICK
7"
3/8" x 1/4"
36"
36"
6"
TWO STICK BOW
No tail
14
12"
12"
3/8" x 1/2"
36"
32"
FOUR STICK
3/8" x 3/8"
10"
10
37"
22"
BOX KITE
30°
30°
30°
Yard Stick
3 TWO STICK BOW KITES
No Tail
1/4" x 1/4"
12"
12"
10"
32"
SQUARE BOX KITE

CIGAR-BOX WAGON

Here is a dandy toy to make during your spare time! It will not take long, and you can make several of them for your friends.

It is intended that the wagon body, or box, as it is usually called, be made from an ordinary cigar box. Dimensions are given in the drawing, however, for use in case a cigar box cannot be obtained or is not desired.

If a cigar box is to be used, then a considerable part of the work is done, but if other material is to be used, the first thing to do is to make a list of what is required.

Material

Cigar box, nails, screws, glue, paint, and basswood or white-pine board are necessary.

Construction

1. Do not make the sides of the box thicker than 1/4 in., or 3/16 in. With this thin lumber, it will be necessary that you use great care in the nailing. After getting out the parts of the box, assemble with glue and fine wire brads.

2. Parts A, B, and C are very simple to make, because they are rectangular in shape and the only forming necessary is to bring them to the dimensions indicated. Set part A 7/8 in. from the rear end of the box. Do not let the sides of the box come flush with the ends of A, but let the ends extend at least 1/16 in. beyond the sides. Should you use material thicker than has been suggested, be sure you lengthen A to suit.

3. Lay out part D carefully, and cut to shape with equal care. From a note on the drawing, you will learn that D is to be fastened to C with two screws, and that C is fastened to B with one screw. Place this screw in the center, and just tight enough to permit part C to turn freely. The reason for this will be easily seen.

4. The handle will not be difficult to make. It is made of a straight piece of stock with a small crosspiece at one end. The corners of the piece may be broken, if desired, with a piece of sandpaper.

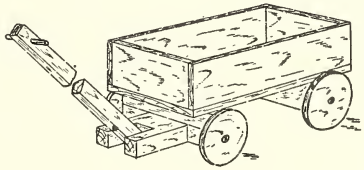
5. The wheels will require the greatest care. Naturally if they are to run smoothly, they should be as nearly round as it is possible to make them. Scribe your circle carefully and work just to the line. Place washers between the wheels and the axles to insure better working of the parts.

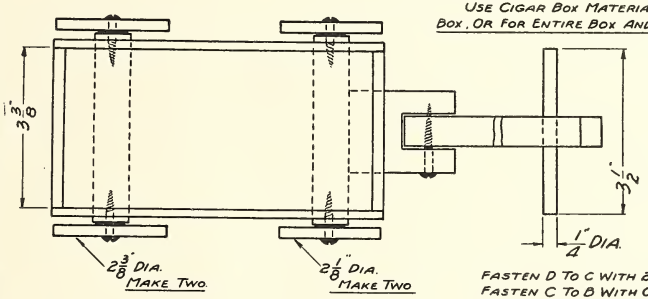
Finish

It is not necessary that the wagon be painted, but of course, it will look much better if it is painted, making the wagon a bright red with black handle and wheels. You may use your own judgment in this matter.

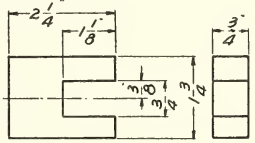
CIGAR BOX WAGON.

USE CIGAR BOX MATERIAL FOR SIDES OF BOX, OR FOR ENTIRE BOX AND THE WHEELS.

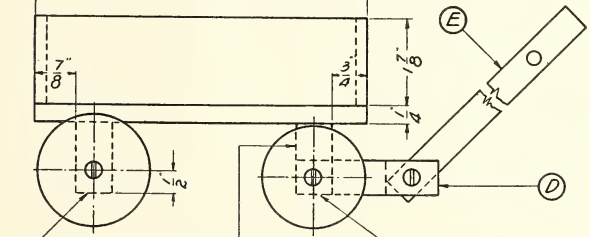




FASTEN D TO C WITH 2 SCREWS.
FASTEN C TO B WITH ONE SCREW TO PERMIT TURNING OF B



(D) MAKE ONE

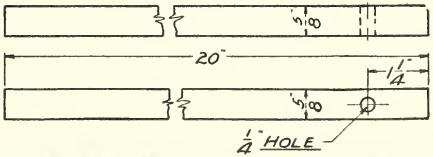


(A) 3/4" x 1 1/2" x 4 MAKE ONE

(B) 3/4" x 3/4" x 4 MAKE ONE

(C) 3/4" x 3/4" x 4" MAKE ONE.

(E) MAKE ONE



1/4" HOLE

DOLL SWING

A swing so simple that even the beginner can construct it for little sister is a good job for the home workshop. When not in use, the swing can be folded up and set away.

Material

A few sticks, some empty spools and a few wire brads, and screws are required.

Construction

1. A table listing the parts and the dimensions of each is shown in the drawing. First, make the four posts A, B, C, and D, and then the parts E and F, which are fastened with brads between the posts, as shown.

2. Fasten parts A and D, with two round-head screws, to the frame already made, and brad the spreader G to the lower ends of the posts just mentioned. This construction will allow the frame to fold inside the posts A and D.

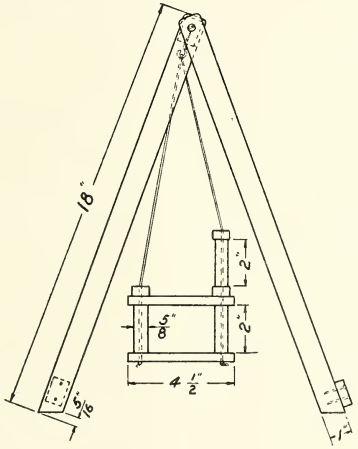
3. Make the seat of a piece of wood ½-in. longer than it is wide, and bore four holes at the corners through which to pass the string. Make the slats forming the arms, back, and front from pieces of box lumber. Bore these slats on the center line about ¾ in. from each end. Make the parts I, J, and K, which hold the slats up from the seat, of small square pieces with holes bored through the centers lengthwise. A ⅛-in. drill will be large enough. However, if you do not possess a drill, make one by flattening and filing the end of a finishing nail. If available, use empty spools for the spreaders.

4. Fasten two screw eyes to the cross beam E, 4 in. apart, and hang the seat to them. To hang the seat, tie a piece of string to a small button, then thread the string up through the seat, spools, and slats at one of the back corners. Determine the height you wish the seat to hang from the floor, and tie the string to the screw eye. Run the string on down through the slats, spool, and seat at the front corner, and either knot the end under the seat, or tie a button to it. Run another piece of string to the other corners and, with a little adjusting, the seat can be made to hang properly.

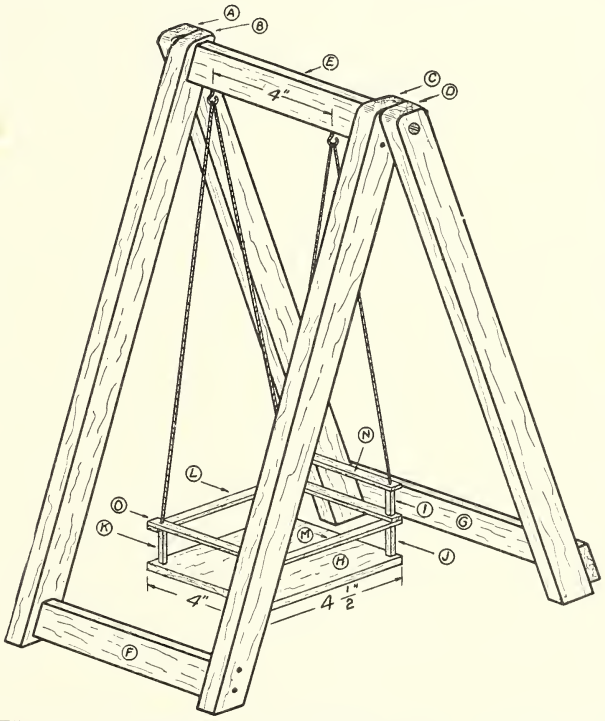
Finish

Paint the swing to match other doll furniture, or stain and shellac if you have the latter finish on hand.

DOLL SWING



PART	THICK	WIDE	LONG
A-B-C-D	1-2"	1"	18"
E-F	3-4"	1 1-8"	8"
G	3-8"	1 1-8"	10"
H	3-8"	4"	4 1-2"
I-J-K	3-8"	3-8"	2"
L-M	3-8"	3-4"	4 1-2"
N-O	3-8"	3-4"	4 1-2"



BIRD BATH AND FEEDER

This bird bath and feeder is constructed of an old discarded porch post and spindles which makes it appear rather fancy, but for those who do not have this material any post will do.

Material

A post of any material, and pieces of pine or cypress for the frames and spindles; galvanized iron for the tray and small galvanized pipe for the overflow; a shelf or wooden brackets, are the necessary materials.

Construction

1. Set the post in the ground, and tamp well or surround it with cement. Saw the top of the post square.

2. Make two wooden frames, A. Fasten them at the corners with waterproof glue and ⅜-in. corrugated fasteners. Cover the bottom of the lower frame with thin box lumber.

3. Make two galvanized-iron pans according to detail pattern B. When bending the metal, clamp a piece of board to line on each side of the tin, and bend gradually by pounding with a hammer. The trays should fit in the wood frames. Bore several ¾-in. holes in the bottom frame to allow rain water to drain off. Only one hole need be made in the upper tray in which to solder the overflow pipe. The pipe should project up through the tray to about three fourths the thickness of the frame. Tack the pans to the frames.

4. Make four posts, and assemble them between the trays as shown.

5. Fasten the perches at each corner of the feeder according to the illustration.

6. Fasten the feeder and bath to the top of the post with nails and brackets.

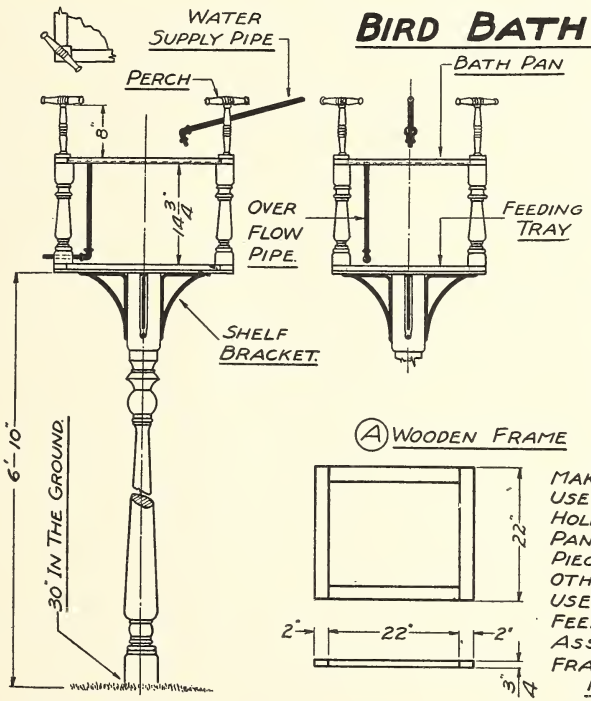
Finish

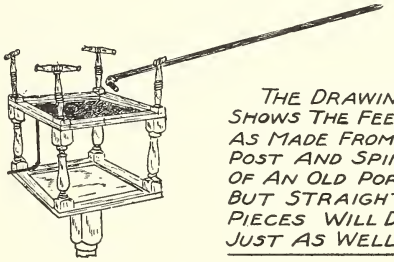
Paint the completed bath and feeder white, cream, or other color to harmonize with the surroundings.

Operation

The feeder is so designed that birds can bathe in the upper tray, which forms a roof over the feeder tray. Persons living in an upper flat can run the overflow from the refrigerator down into the upper tray, thus furnishing the birds with cool, fresh water continuously as the ice melts all through the summer months. Others will have to fill the bath with a hose or a pail of water several times during the day. The lower tray or feeder can be used all year round. To prevent it from filling with snow in the winter, tack a curtain or cellophane cloth around three sides of the opening between the trays. Leave the side facing opposite the direction of the prevailing winds open.

BIRD BATH AND FEEDER.



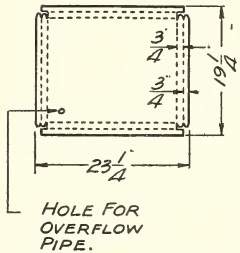


THE DRAWING SHOWS THE FEEDER AS MADE FROM THE POST AND SPINDLES OF AN OLD PORCH, BUT STRAIGHT PIECES WILL DO JUST AS WELL.

(A) WOODEN FRAME

MAKE 2 OF A. USE ONE TO HOLD BATH PAN. NAIL 1" PIECES TO THE OTHER AND USE FOR FEEDING TRAY. ASSEMBLE FRAMES WITH NAILS.

(B) GALVANIZED IRON PAN.



BEND ON DOTTED LINES TO FORM PAN WITH A 3/4" STRIP ON OUTSIDE TO REST ON THE FRAME. CORNERS TO BE SOLDERED.

DOVE COTE

Many boys would like to keep pigeons or doves, but they think it requires a very elaborate equipment to care for them. The arrangement shown in the drawing was made and used by a boy very successfully and it is presented here with the hope that it may answer the needs of other boys who would like to keep pigeons.

The illustration shows a working drawing of the part in which the birds are housed, while a perspective drawing is used to show the frame which is attached to it. To avoid the use of many lines, which would tend to destroy the clearness of the construction features of the frame, no wire screen is shown, nor is the bottom indicated.

Material

Cypress will be found the best material to use for the construction, although, if that wood is not available, any wood will do. Chicken wire, and paint also are necessary.

Construction

1. A single board may be used for the front and back pieces of the part in which the pigeons are housed, the grain of the wood, of course, running lengthwise. It is divided into five sections. Lay out the openings with a compass, and cut them to shape with a coping or turning saw.

2. The construction of the frame will not be difficult. Only dimensions for width and height are shown; the other dimensions may be adjusted to suit the material you will have to work with. The frame need not be made from heavy material.

3. Make the bottom from trellis strips spaced about ½ in. apart. This will permit the birds to walk easily, and also make it easy to clean the inside.

4. Cover the entire frame with chicken wire. Where it runs over the roof at the ends, secure it in a manner that a small space will be provided for the removal of material that may collect on the roof at these points.

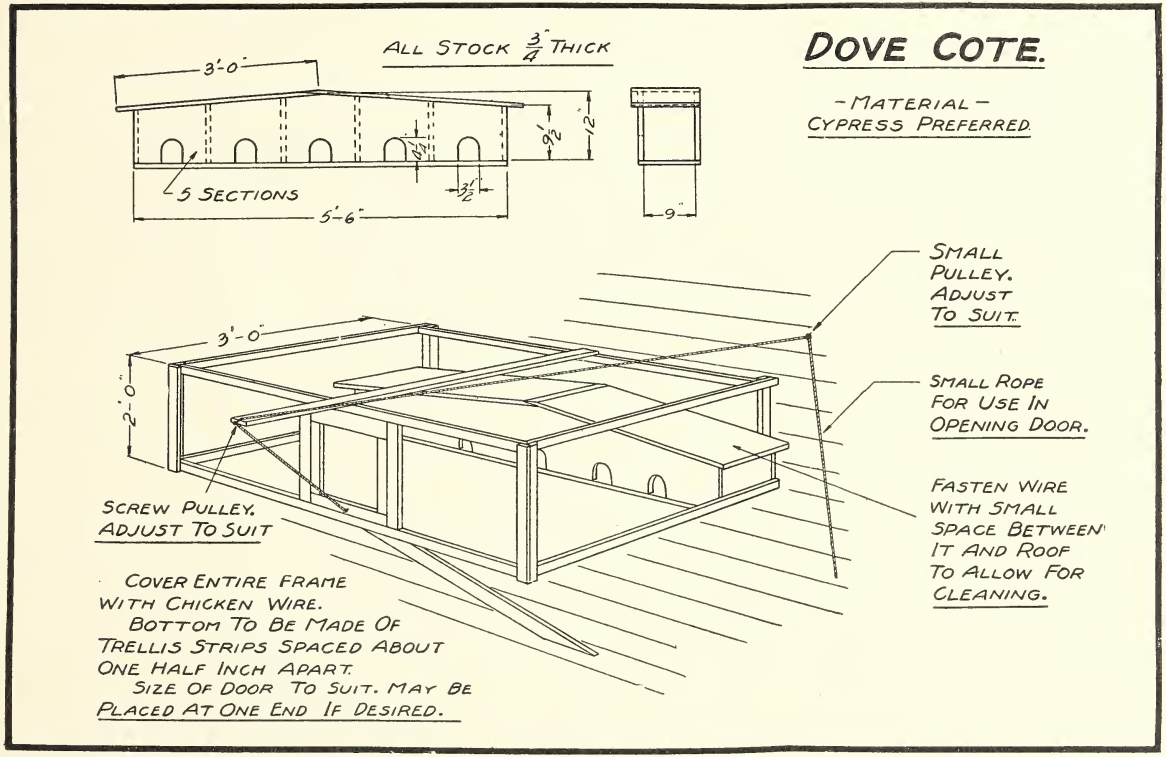
5. The door may be of dimensions to suit. If the outfit is to be used merely to confine the birds, only a small door will be necessary, but if it is desired to open it and permit them to fly in, make the door about 14 in. wide by 18 in. high.

6. The purpose of the small rope is to provide a means of opening and closing the door easily. The strip running across the top, to which the screw pulley is attached, should extend far enough out to permit the door to open its full capacity. Adjust this pulley so that the rope may run back to the building at an angle, in order that the pull from the ground will be nearly straight. If desired, the door may be placed near one end.

7. Fasten the cote to the side of a building or any other place desired, additional security being obtained by the brace running from the frame to the building.

Finish

Paint the cote white or any other color to protect the wood.


DOVE COTE.
- MATERIAL -
CYPRESS PREFERRED.
ALL STOCK 3/4" THICK
3'-0"
5 SECTIONS
5'-6"
9½"
12"
3½"
9"
SMALL PULLEY. ADJUST TO SUIT.
SMALL ROPE FOR USE IN OPENING DOOR.
FASTEN WIRE WITH SMALL SPACE BETWEEN IT AND ROOF TO ALLOW FOR CLEANING.
3'-0"
2'-0"
SCREW PULLEY. ADJUST TO SUIT
COVER ENTIRE FRAME WITH CHICKEN WIRE.
BOTTOM TO BE MADE OF TRELLIS STRIPS SPACED ABOUT ONE HALF INCH APART.
SIZE OF DOOR TO SUIT. MAY BE PLACED AT ONE END IF DESIRED.

AIRPLANE

Model airplane building and flying for many years has occupied the interest of boys and young men. But no great progress was made until balsa wood was shipped into the country and made available for boys' work. Balsa wood is one-third lighter than cork and quite strong, so it is excellent material for model airplane work.

Material

Balsa wood, piano wire, rubber thread, Japanese tissue, ambroid glue, and bamboo are required.

Construction

1. Make the fuselage frame of two 33 in. strips of balsa or light pine, and two cross members and wire stays fastened to the fuselage with brass or tin strips glued to the beams.

2. Carve the two propellers, F, of white pine or balsa wood. Make two bearings, A, of brass, aluminum, or of a flattened brad. Make a hole by driving a victrola needle through the bearing. Bind and glue the bearings in place. Make the propeller shaft B of music wire, fasten and glue in the propeller, and assemble it to the bearing.

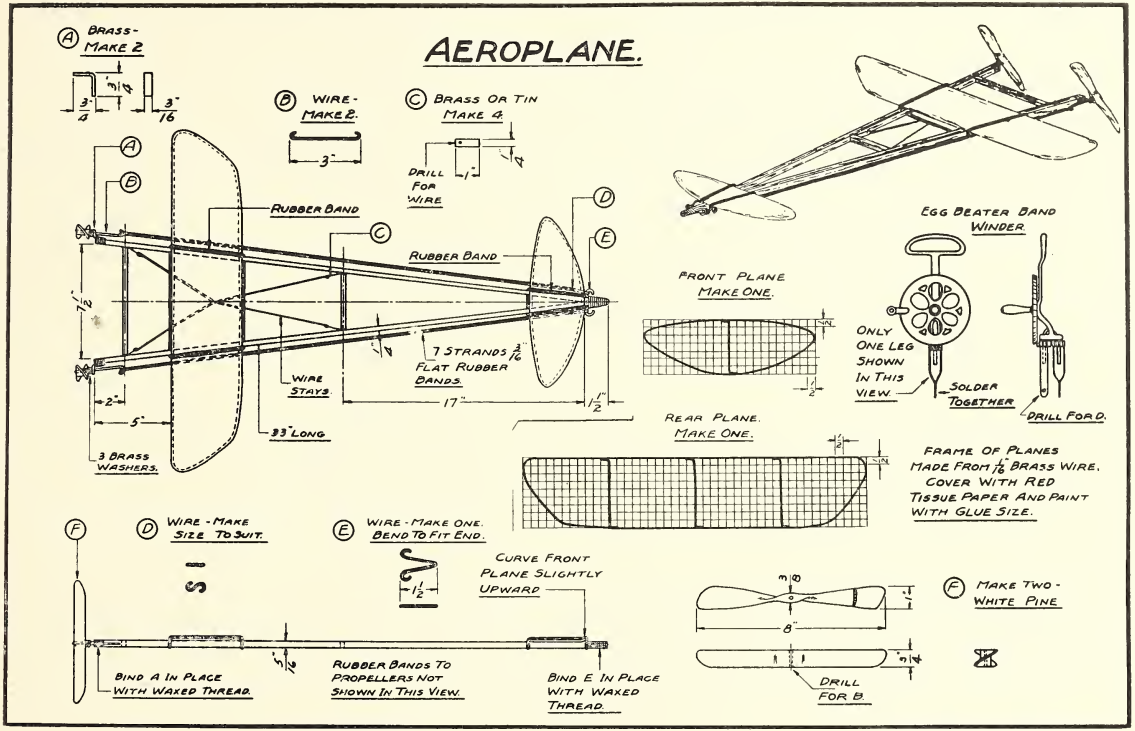
3. Make two S hooks D and end hook E, and bind and glue the end hook to the end of the frame. Attach several strands of large rubber thread to the propeller-shaft hook and S hook which is hooked to the end hook.

4. Make two wings or planes. Use balsa wood, bamboo, or wire for the frame of the wing. Lay out the pattern on the board, and drive nails on the line. Heat the bamboo over a candle, and form it around nails. Glue the ribs in place. Fasten the wings to the frame with rubber bands. Wooden wedges can be made and placed under the wings to give elevation to the front edge causing the plane to rise. Cover the wing with Japanese tissue, and paint with dope or glue size to tighten and color the paper.

5. Make a winder by remodeling an egg beater as shown, and making holes to receive the S hooks in the beater legs.

Operation

Wind the rubber motors with egg-beater winder, replace the S hooks in the end hook, hold the propeller and the end of the frame stick, point it up at a slight angle, and launch the plane.


AEROPLANE.
A BRASS - MAKE 2
B WIRE - MAKE 2.
C BRASS OR TIN MAKE 4.
DRILL FOR WIRE
RUBBER BAND
RUBBER BAND
7 STRANDS 3/16 FLAT RUBBER BANDS.
WIRE STAYS
33" LONG
3 BRASS WASHERS.
FRONT PLANE MAKE ONE.
REAR PLANE. MAKE ONE.
EGG BEATER BAND WINDER.
ONLY ONE LEG SHOWN IN THIS VIEW.
SOLDER TOGETHER
DRILL FOR D.
FRAME OF PLANES MADE FROM 1/16 BRASS WIRE. COVER WITH RED TISSUE PAPER AND PAINT WITH GLUE SIZE.
F
D WIRE - MAKE SIZE TO SUIT.
E WIRE - MAKE ONE. BEND TO FIT END.
CURVE FRONT PLANE SLIGHTLY UPWARD
BIND A IN PLACE WITH WAXED THREAD.
RUBBER BANDS TO PROPELLERS NOT SHOWN IN THIS VIEW.
BIND E IN PLACE WITH WAXED THREAD.
DRILL FOR B.
F MAKE TWO - WHITE PINE.

CLOTHES HAMPER

A clothes hamper is a handy piece of furniture to have in any room, especially if a clothes chute is not available or close at hand. The basket type of hamper is well ventilated through the side walls. Ventilation is necessary and, in the inclosed hamper holes bored in the bottom of the cabinet allow air to circulate through the soiled linen.

Use

The clothes hamper may be used for storing soiled linen and other soiled clothing, or is convenient for storing paper, soap, and toilet articles when other space has not been provided.

Material

Basswood, gumwood, white pine, or any other lumber that may be available, wall board, hard board, Celotex, or plywood used for paneling are the necessary materials.

Construction

1. Study the drawings carefully, and note that the drawings on the left show the hamper complete, giving all the necessary dimensions and details. The upper right-hand drawings show the frame construction and the same covered. The lower right-hand drawings show two more drawings leading to the final completion of the job.

2. Make the frame, composed of four posts, the top frame, and the bottom board. Bore the five holes in the bottom board, and assemble according to the drawing, with finishing nails and glue.

3. Cover the front, back, and ends with prepared board, tacking and gluing the board to the framework.

4. Make the legs and cross strips, which are $\frac{3}{8}$-in. thick. Note that the end-leg strips must be $\frac{3}{8}$ in. narrower than the front-leg strips, to appear the same width when nailed and glued together. Fasten the legs and top and bottom strips to the frame with glue and brads.

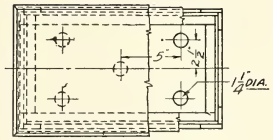
5. Make and fit the four strips around the top edge of the hamper, allowing them to extend $\frac{1}{8}$ in. over the outside of the hamper, but have them come flush with the posts on the inside.

6. The lid is the last part to make. It has a $\frac{1}{8}$-in. chamfer around the top edges and is fastened to the hamper as shown with 2-in. hinges.

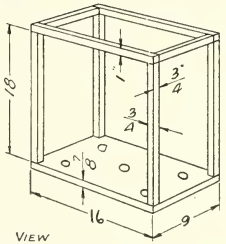
Finish

Try to match the finish of the room in which the the hamper is to be used. Apply three or more coats of paint, enamel, or lacquer.

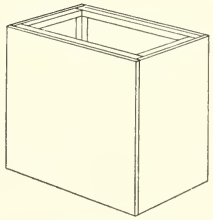
CLOTHES HAMPER.



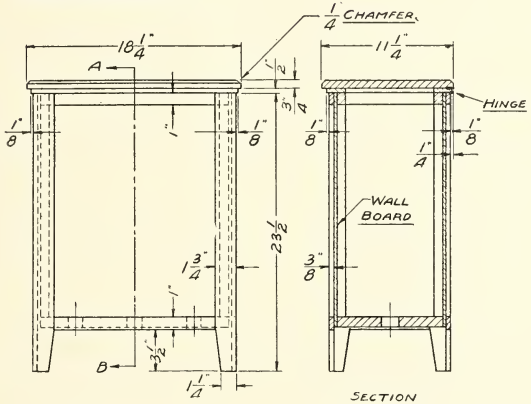
MATERIAL -
WALL BOARD
AND WOOD.
PAINT TO SUIT.



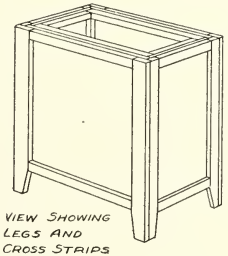
VIEW
SHOWING FRAME.



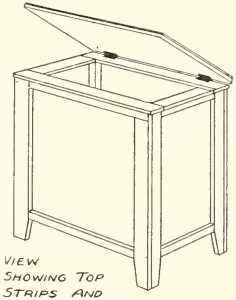
VIEW SHOWING WALL
BOARD IN PLACE.



SECTION
THROUGH AB



VIEW SHOWING
LEGS AND
CROSS STRIPS
IN PLACE.



VIEW
SHOWING TOP
STRIPS AND
COVER IN PLACE.

FIRELESS COOKER

While it is quite likely that everyone is familiar with the principle of the fireless cooker, it may be well to explain that this cooker does not dispense entirely with the use of fire. There is no direct application of fire in the cooker itself, but before being placed in it, the food must be cooked. After the food is placed in the cooker, however, it will continue to cook and will remain hot overnight. Expensive cookers are equipped with special plates and will do things that this simple homemade cooker cannot do, but the latter will work very satisfactorily in cooking breakfast foods, vegetables, etc.

Use

The fireless cooker is used in the home, hotels, and camps.

Material

White pine or any other wood available, excelsior, and newspapers are required.

Construction

1. The dimensions given are suggestive, and can be changed to suit containers and lumber you may have. Construct the box of single-width pieces or of several narrow boards glued together. Assemble the sides and bottom pieces with glue and finishing nails.

2. Make the shell, and cut the hole in it to fit the utensil to be used, which may be a large tin or pail. A tin pail, with straight sides and tight-fitting cover, will do very nicely. The shelf must be made of two pieces so one can be removed to assist in compressing the packing around the well. Nail the shelf to cleats and the pail to the shelf.

3. Make the packing by rolling excelsior and newspapers together and cutting into 2-in. slices with a handsaw. Pack tightly around the well.

4. Fasten the cover to the box with hinges, and for support when open, attach a small rope or chain to the cover and the side of the box. Attach a catch for fastening the cover.

5. Make a cushion to be used in the space indicated. Stuff with the same packing used in filling around the well.

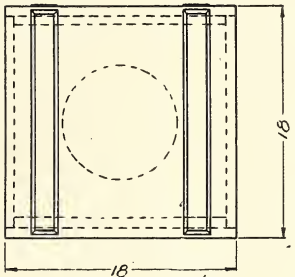
Finish

Paint, or stain and varnish, which will make the box more nearly air tight.

Operation

Place food in a cooking utensil that will fit the well. Place the utensil on the stove and leave it there until the food begins to cook; then place the container in the well, cover it well, and place the cushion over it. Fasten the top, and leave it until the food is needed to serve. Special heating stones may be purchased to set in the well below and above the cooking vessel; in this case, the well should be made to fit the stones.

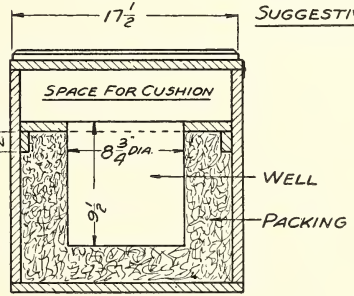
FIRELESS COOKER.



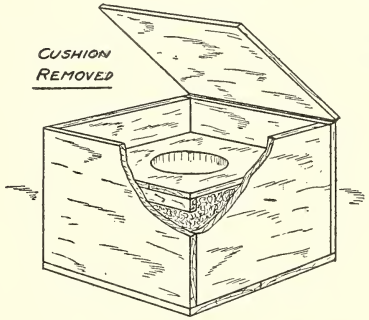
ALL STOCK 3/4 THICK

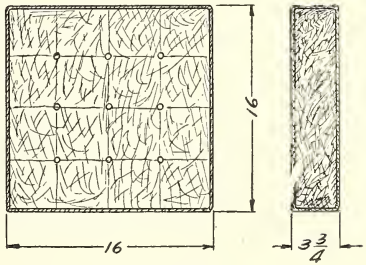
TO SUPPORT COVER WHEN OPEN, FASTEN ROPE OR CHAIN TO COVER AND SIDE OF COOKER.

THE WELL MAY BE MADE ANY TIN UTENSIL WITH TIGHT FITTING COVER. DIMENSIONS ARE ONLY SUGGESTIVE



SECTION THRU AB





CUSHION

INDEX

Airplane, 152
Ash Sifter, 106
Auto Creeper, 116
Auto Truck, 82

Balance Scale, 138
Bicycle Flag Holder, 76
Bingo Stick and Pinwheel, 118
Bird Bath and Feeder, 148
Bird Houses, 40
Book Trough, 58

Candle Holder and Bank, 38
Christmas Decoration, 70
Christmas-Tree Stand, 64
Cigar-Box Wagon, 144
Clock Case, 128
Clothespin Blacksmiths, 48
Clothes Hamper, 154
Crochet-Ball Holder, 52

Dancing Jim, 54
Doll House, 98, 100
Doll Swing, 146
Double Windmill, 122
Dove Cote, 150
Dutch Windmill, 134

Fireless Cooker, 156
Fireside Bench, 18
Footmobile, 24

Hand Sled and Child's Seat Attachment, 104
Handy Play Table or Workbench, 110
Holder for Salt and Pepper Shakers, 124
Homemade Drill Equipment, 28
How to Cane a Seat, 16

Jumping Jack, 80

Kicking Donkey, 32
Kiddie Knitter, 30
Kites, 142

Lap Board, 140
Lemonade Stand, 102

Marble Game, 42
Motor Truck, 90

Nail Box, 26
Paint or Shellac Can, 126
Paint Remover, 74
Pencil Box, 88
Picture Frame, 60
Post Box, 62

Sail Boat, 96
Sewing Cabinet, 84
Shoe-Polishing Stand, 72
Sidewalk Coaster, 50
Skate Sail, 20
Slingshot Glider, 14
String Winder, 44

Teddy-Bear Blacksmiths, 56
Telephone Pad and Grocery List, 36
Tin-Lined Fern Box, 34
Tool Case, 68
Toothpick Toys for Girls and Boys, 66, 132
Towel Holder, 136
Toy Camel, 112
Toy Lion, 108
Trek Cart, 120

Washington and the Cherry Tree, 22
Watch Holder, 94
Wheelbarrow, 130
Window Cold Box, 78
Window Screen, 92
Window Ventilator, 114
Wood Pincers, 86

Yarn Reel, 46

SOLAR'S HAND CRAFT PROJECTS

PROBLEMS IN BOOK 1

Work Bench
Combination Bench Hook
Toy Pig
Child's Morris Chair
Cutting Board
Toy Cannon
Bath Room Cup Holder
Skate Sharpener
Steam Engine
Toy Elephant
Feeding Bird
Flying Propeller
Potato Gun
Wooden Doll
Thanksgiving Gobbler
Aeroplane Weathervane
Small Cart
Red Cross Ambulance
Baby's Rocking Horse
Jumping Jack
Hula Dancers
Mechanical Duck
Scout Firemaking Set
Bob Sled
High Speed Drill
Crumb Tray
Flag Holder
Toy Rabbit
Target Pistol
Jack Be Nimble
Boy Scout's Heliograph
Ground Scratcher
Child's Snow Shovel
Kites
Puzzles
Trench Mortar
Straddle Horse
Bag Puncher
Low Folding Table
Letter Rack
Silhouette Camera
Sewing Companion
Ornamental Garden Sticks
Mouse Trap
Boy's Handy Wagon
Traveler's Case
Hallowe'en Fun Makers
Wind Mill Acrobat
Sail Boat
Chair Lamp
Leg Rest
Bull Dog
Christmas Tree Stand
Baby Auto Car
Fly Trap
Plant Box
Submarine
Phonograph Dancer
Telephone Screen
Pin and Ball Game

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SOLAR'S HAND CRAFT PROJECTS

PROBLEMS IN BOOK 2

Work Bench
Wood Turning Lathe
Foot Power Jig Saw
Drill Press
Kicking Donkey
Door Stop
Solitaire Game
Woodpecker Door Knocker
Robin and Wren Box
Dart and Target Game
Bow Gun
Bed Side Table
Tumbling Toby
Doll's High Chair
Old Doc Quack
Fourth of July Outfit
Geyser
Frame for Child's Swing
Six Candle Power Steam Engine
Water Gun
Smoker's Cabinet
Checker Table
Book Supports
Armored Car
Bob Sled
Turning Saw
Mechanical Duck
Automobile Cart
Bread Board
Toy Giraffe
Match Holder
Toy Goat
Drawing Table
Disk Broom Holder
Fighting Bull Dogs
Doll Cradle
Baby's Bed and Play Yard
Boy Scout First Aid Kit
Easter Chickens
Towel Rack
Knife, Fork and Spoon Box
Pea Shooter
Broom Holder
Foot Bench
The Little Red Hen
Bank
String Cutter and Winder
Knitting Basket
Flour Box
Umbrella Stand
Doll Bed
Doll Costumer
Book Trough and Shelf
Traveler's Shoe Polishing Case
Christmas Tree Table
Wagon
Game of Hearts
Boy Scout Belt Kit
Child's Toy Wheelbarrow
Wooden Waste Basket
Scarf Pin and Collar Button Holder
Taboret
Arm Chair
Hissing Raven
Medicine Cabinet
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